WHAT'S IN STOCK FOR YOU?

"BEEF COW EFFICIENCY"

February 3 - 5, 1987

Saskatoon, Saskatchewan

Saskatchewan Agriculture

Saskatchewan Livestock Association

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ACKNOWLEDGMENTS

The 1987 **What's In Stock For You?** lived up to its reputation for challenging Saskatchewan's beef industry. The seminar started with the production theme "Beef Cow Efficiency" but evolved into a good mix of **production** and **marketing.** The Organizing Committee would like to thank the speakers for their excellent presentations. New ideas are a valuable input in any industry.

We thank our **Exhibitors** whose displays and technical staff provided other management information to those attending:

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Lastly we thank all of you who came to **What's In Stock For You?"** Your active participation is really what makes this seminar so successful. Thank you.

The Organizing Committee

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WHAT'S IN STOCK FOR YOU

C.M. Williams, Professor
Deptartment of Animal & Poultry Science
University of Saskatchewan
Saskatoon, Saskatchewan

It is a privilege to provide the opening remarks for this annual stockmen's conference. The quality of past meetings and the promise of this agenda are a credit to the organizers and audience.

I have been asked to set the stage for the discussions that will follow - a challenge in itself. It is even more daunting when I look over the expertise that will be applied to the overall topic of BEEF COW EFFICIENCY.

OVERALL CLIMATE

Beef, beef cattle and those that produce them have become political footballs being bounced around as politicians search for ways out of the current world-wide economic mess. The conflict in agriculture is centered on the trade in grains but the waves involve all agricultural products.

The low prices for exportable grains that have resulted may seem to be a bonanza for red meats industries in the short run, but have the seed of disaster because of the uncertainty produced by such grain trade conflicts. National self sufficiency, economic recession and protectionism have been world-wide phenomena. The route back to normalcy with industries competing on some reasonable basis of geographic advantage and productivity has not yet been identified.

Major players are the US and the EEC with their very dominant economies. They are moving away from a solution rather than towards one. We grab at signs that more rational approaches are being promoted but that may be more wishful thinking than actual fact. It was encouraging that the US and the EEC solved their conflict over their Spanish-Portugese loss of grain sales. The inclusion of agriculture and

agricultural subsidies on the GATT agenda is likely the most positive step that has been taken in attempting to rationalize the agricultural market situation. It is also encouraging that some of the leading spokesmen in the US are questioning the basis of the export aspects of the 1985 US Farm Bill. But the proposed countervail on beef moving from Canada into the US is alarming.

Our close and friendly neighbour to the south is hurting from an immense trade imbalance and an astronomic national debt. The US situation is drawing only minimal cooperation and sympathy from the EEC, particularly West Germany and Japan. This is leading to a rather nasty attitude towards the outside world by the US. Canada, for a number of reasons including our trade links and proximity, is being roughly trampled. The situation will likely get much worse before it gets better. Those of us that live by the beef industry are hopeful that the US can get itself straightened around very quickly in terms of world trade. The Canadian beef industry, despite its relatively squeaky clean relationship with the US, is not likely to escape entirely. Specifically, the free trade issue has been soundly supported by spokespersons for the Canadian beef system but it seems doomed to the fate of a bureaucratic boondoggle.

DIRECTIONS FOR CHANGE

The beef industry has been less prone to change its management patterns than the dairy, swine and poultry industries for a number of reasons. The people who produce beef may be more conservative in their attitudes but the main reason is that beef production is tied to harvesting native pasture and rotational crops required for good cropping practice, and to utilizing crop aftermath and grains surplus to the export market. Because of this close link with cropping, the emphasis for change is in the field rather than the corral. That is not to say that improvements have not occurred, but rather that the management framework has been somewhat static. It is my belief that there will be a departure from that pattern and that we are on the brink of a dramatic change in the way beef cattle are raised, marketed and even consumed.

Change will come and it will be market driven. We have already experienced the strong shift to leanness in the feeding and breeding aspects in response to consumer demand. The trend to capture efficiencies of scale in the feeder sector is going to have a major impact on the cow-calf industry and the total system. Weight and age at weaning, and growth and fattening characteristics of stockers and feeders will be more tied to the needs of the feedlot than the specific resources of the cow-calf producer. It is just another step in breaking down the old attitude that what was required was to train the consumer to relish the product we could most easily produce.

A leap ahead was accomplished with selection for growth. Performance was further improved through the use of disease control measures and growth stimulants. These aspects may well be in for some radical changes. The assurances of the Food and Drug tests have not quieted the objections of the consumer about products that may carry residues and that are not 'natural'.

We have two choices; to use a delaying tactic while new technologies come on line or to put on our white hats and become the heroes by quickly fazing out these management aides. I lean toward the latter solution.

Techniques and technologies are being introduced that will move beef production to a new plateau. Through genetic manipulation, physiological interventions, nutritional micro-adjustments and, hopefully and perhaps most importantly, through streamlined marketing methods, the industry will become not only economically feasible as

in the past but efficient in energy and protein conversion on a par with other livestock systems.

The strengths of industries in other than agriculture have been either the emergence of giants of industrial concentrations as in the auto industry, or in vertical or horizontal linkages as with the food distribution systems.

In agriculture there has been the added power of marketing strength for grain farmers through the grain pools and the Canadian Wheat Board. The poultry and dairy industries have gone to supply management which has developed a power that gives a guarantee of a production-plus return.

Our insistence on independence in the beef industry has left us without the ability to speak as an industry. One may feel that, for example, the Canadian Cattlemens Association speaks for the industry. That is not quite true. Good as they are, they tend to be an informational and lobbying agency. I believe there will be or at least should be an agency similar to the Canadian Grains Council which could represent the interests of the beef industry. I foresee a considerable increase in the orderliness of the collection, sorting, feeding and marketing of beef cattle in the future which will be brought about mainly by the strength of the feeding industry. Garnet Altwasser recently predicted that within 10 years there will be only eight major feedlots in Alberta. I would guess that small feedlot operations would background cattle. Realizing a profit in the actual feeding and finishing of cattle requires economies of scale in the range of 20,000 to 30,000 head.

EFFICIENCY

During the course of this seminar, the efficiency of the beef cow will be described from the point of view of the feeder, the breeder, the producer and the economist. Let me take a slightly different tack and briefly examine the efficiency as a system.

I have on many occasions admitted to bank managers that a beef operation will not usually show a profit under the normal rule of the accountant. Charging all costs in a business-like manner will under all but the most favorable conditions lead to a red or near red figure in the last column. When the operation is measured by whether the operator has more or less money in his pocket at the end of the year depending on whether there was a beef operation on the farm, the answer is invariably that the beef operation has almost magically created money. Understanding why is not difficult. Beef cattle use resources that would otherwise be unused or under-used. Such resources include feed, labour, buildings and equipment. The farm benefits from the presence of the cattle by the improved efficiency of resource use. That has been the basis of beef production in Saskatchewan. Although we have ranch-type operations in the south and west of the province, the majority of our cattle are produced on mixed-farm operations. Beef cattle are a resource that can be utilized in our systems. The question is how to make that total system more efficient.

An idea emerging with the farm cash-flow problem is that we must move from measuring our farms in view of **maximizing** our use of resources and instead take the approach of **optimizing** their use. That statement is worthy of an explanation because it is rather a fundamental idea that is emerging.

Starting in the early 1920's, Saskatchewan was geared for a wheat industry for a number of reasons. Government policy, farm practice and research was directed to generate power in the wheat industry and in the allied grains industry to ensure that top quality grains were available for export. That meant that through the government policies, farmers who wanted to increase their income did so by acquiring more land and more machinery to increase their volume. That is not in the game right now. Instead, more must be produced with existing resources. Use of resources must be optimized. I believe that is the direction agriculture must and will take. Combining operations on the same farm, utilizing all resources including labor, perhaps including a son or daughter and setting up another operation to use existing resources must be carefully looked at. That's the way the general trend will have to be. There may also be some things we haven't done in the past that we may be forced to do now. One reason for the success of the bigger farming operations is that they have been prepared to purchase the services that they could not themselves provide, instead of taking the self-sufficiency approach that most farmers have.

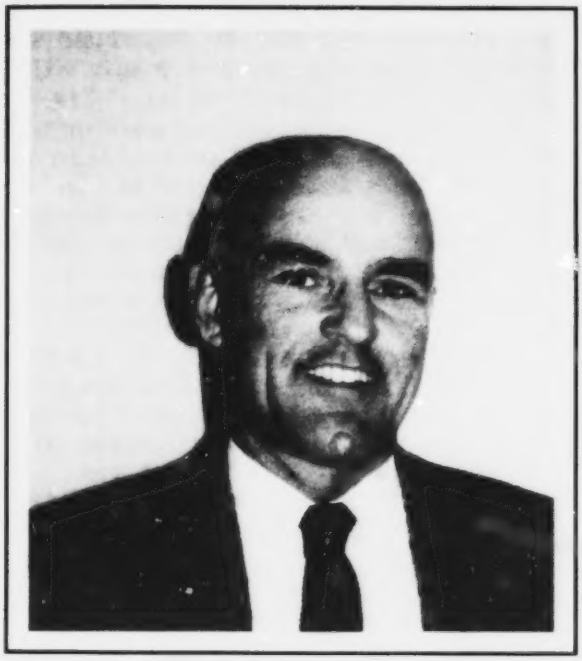
I firmly believe that we are going to stay with small beef operations. Many are predicting bigger farms and corporate farms. Perhaps in lettuce growing, perhaps in wheat, perhaps in milo, perhaps in corn and field crops that lend themselves to tremendous economies of scale, but the majority of beef will still be produced by relatively small operations which will be amalgamated and fitted into other types of enterprises. With that in mind, what can be done to optimize use of resources?

I have been kicking around an idea that I believe has some merit. A 50 to 60-cow herd cannot afford a full line of machinery to harvest and handle forage. I think there are some real merits to bulk-handling cows in the winter and bulk-handling the harvesting of forages. One person, one operation, could handle the cows in the winter for several farmers, freeing them for possible off-farm employment. Bulk-handling of forages would be more cost efficient. Each farmer would not be required to invest in forage handling equipment. These directions are a possibility. Whether the farming public can see their way to doing so is not clear. Such integration would take a community commitment.

IN CLOSING

Efficiency comes in many shapes and guises. I welcome you to the following presentations that will give you new insights into managing beef cow herds.

AN EFFICIENT COW:
ONE THAT FITS YOUR ENVIRONMENT



P.H. (Doc) Hatfield
Hatfield's High Desert Ranch
Brothers, Oregon

BACKGROUND

The definition of an efficient cow would depend on your perspective. From a large animal veterinarian's standpoint the cow provides a livelihood by virtue of her many functional defects. Too much of a veterinarian's time is spent on calving problems, foot problems, prolapses, bad eyes and udder disorders-all the result of inadequate genetic makeup or poor management. Such frustration prompted us to trade our veterinary practice in Montana for our desert operation in Oregon. We went to the desert with the goal to breed fault-free functional cattle that could work on their own under practical conditions and situations with little help from us.

The selection criteria we established to produce these cattle are:

1. They must have a good disposition. We breed our cows AI. We only have one horse and some motorcycles on 14,000 acres. Our help is not the buckaroo type so the cattle have to be gentle enough that we can easily handle them.

2. They must conceive within 45 days as yearlings on rations the ranch can provide. That means no grain in our area. These heifers must reach puberty at a young age and light weight. They have to make their growth after they are bred, not before.

3. Two year old heifers must deliver their calves without assistance when bred to a breed of similar size and biological type.

4. Our cows must have a strong mothering instinct. Too many cattle have no genetic urge to lick their calves and take care of them.

5. **Good teat and udder conformation** are required. A plentiful supply of milk is no good if the calf can't suckle. The milk is of no value when the udder spoils.

6. **Sound feet and legs** are necessary so that our cattle can withstand the rugged terrain.

7. Two year old heifers must breed back **for a second calf in a 60-day breeding season.**

8. **Two year olds must have sufficient milk to wean a heavy calf,** one that will fit in with the same load as calves from the older cows. In the cow business, it is difficult to produce a uniform group of calves. Small, scrubby calves from two year olds would only add to that problem.

9. **Cows must calve every year thereafter in a 60-day calving season.**

10. Our cattle must **produce red meat in a form that someone wants.** For too long a time we have tried to tell people that what we have is a great product and they should buy it, rather than ask them what they want and produce that type. If a cow does everything but accomplish that final task, she is culled.

We breed 100% AI and use no bulls. We run 400 mother cows and breed all the heifers, totalling 550 females for AI breeding. The bulls we use must be from dams that have the kinds of traits our cows do. Based on those traits, 75% of the bulls in the AI studs today should probably be steered. When choosing a bull for AI use we want a bull whose mother calves unassisted at two years and who bred back on time at 3 years of age. Such bulls are scarce in AI studs because they don't raise frame scores of eight.

Providing steers to a feedlot is an important function of any cow-calf operation, but to expect much improvement at the cow-calf level with better gaining steers is wishful thinking. A cow-calf business is a by-product business. The only justification for us to exist is to utilize some products that would otherwise go to waste. We can't begin to compete with pigs and chickens unless most of a beef cow's diet is based on roughage that would otherwise go to waste. The roughage is there whether cows are or not. An efficient cow is one that utilizes what is available. The principle of fitting cattle to forage is the same everywhere. Our philosophy is that **it is not the ranch's job to produce what the cow needs to perform. It is the cow's job to perform on what the ranch can best provide.**

We have 8,000 acres of winter range at home and 6,000 acres of deeded ground to the north for late spring, summer and fall grazing. We normally have about 90 days of snow. Our ranch is made up of the remnants of old abandoned homesteads. The cabins stand as testimony to those who failed trying to change a hostile environment to fit their needs. Our cattle graze 12 months of most years on crested wheat grass and desert bunchgrass.

Most talks on cows and grass start out with the grass but we need to get back a little farther and take a look at the whole picture. It is not just the grass, but the trees, the soil, the sun and the water that must be looked at together. Cows by themselves don't mean much. We have to become a part of that total environment if our operation is going to work. A major concern in any operation is the people part. The real chore and challenge is getting people thinking alike to accomplish a similar goal. Record keeping and pencil work are essential in our operation to understand what the cattle are doing and why and to determine whether they really do fit our environment.

THE GRASS

We use our cows to harvest and enhance our native grass. We apply holistic resource management techniques. We have none of the grazing cells that HRM employs but use the thinking behind it which is a way of putting everything together.

Figure 1 shows what we attempt with our grass management. The first requirement of any cattle operation is to determine what resources are available and secondly, to optimize the production of feed off that land. The cow's nutrient requirements, depicted by the solid line on the graphs, coast along moderately until she calves. Nutrient requirements are then approximately doubled and remain high until weaning when they drop back down for the remainder of the year.

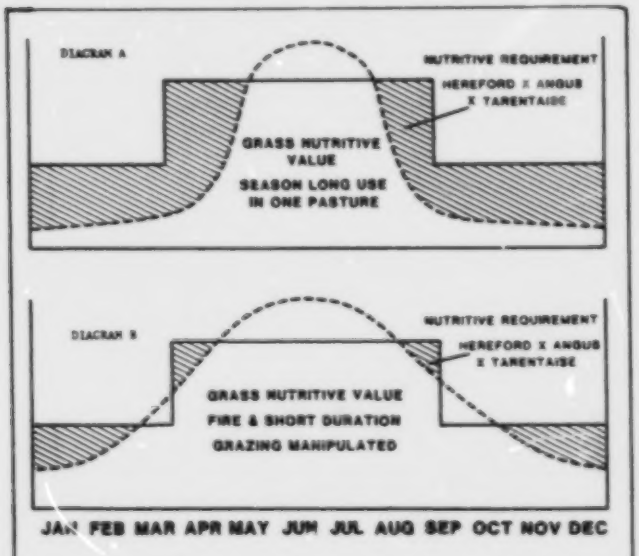


DIAGRAM A
NUTRITIVE REQUIREMENT
HEREFORD X ANGUS X TARENTAISE
GRASS NUTRITIVE VALUE
SEASON LONG USE IN ONE PASTURE
DIAGRAM B
NUTRITIVE REQUIREMENT
HEREFORD X ANGUS X TARENTAISE
GRASS NUTRITIVE VALUE
FIRE & SHORT DURATION GRAZING MANIPULATED
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Figure 1. Differences in grass quality between managed and unmanaged grass.

The grass nutritive value curves represent value, not amount of grass. The trick to making a profit off the land in a grazing operation is to change the nutritive value of the grass from A to B, to better match the requirements of the cow by manipulating grazing. Requirements of the cow do not change, but the need for supplemental feeding, represented by the areas filled in with diagonal lines, can be reduced. In our case we have no cheap source of supplemental feed. Changing our grass management makes our grass more nutritionally valuable.

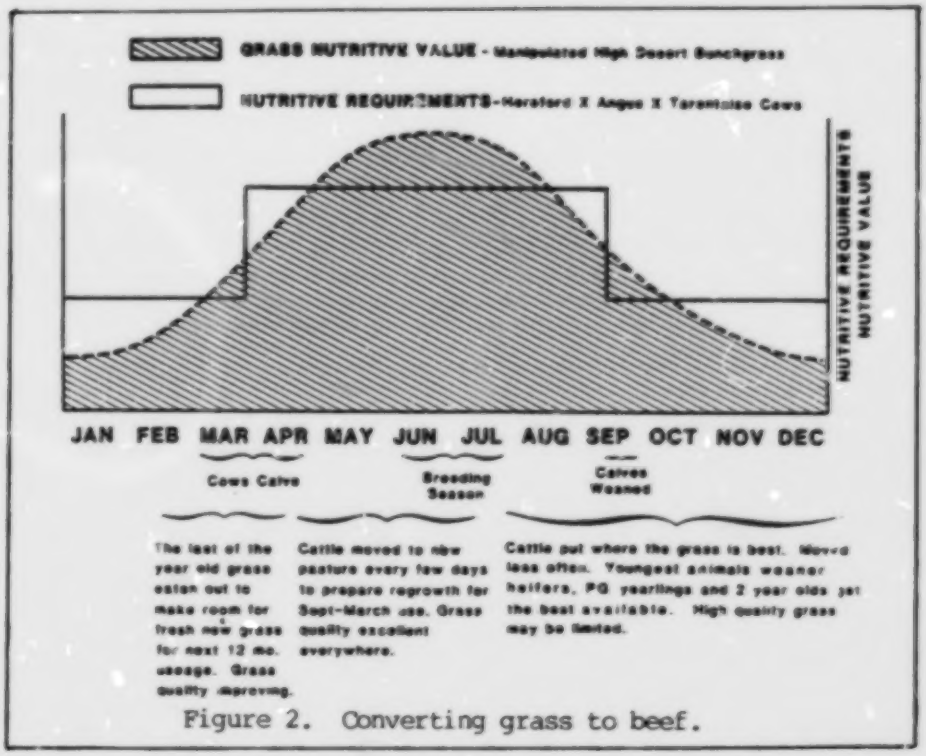
The majority of our grass crop for the year is grown in May and June. Grazing management is highly intensive during this critical period. All cattle are run together in one herd and are moved quickly and regularly every 2 to 10 days between grazing units. The point of their moving is to have every plant bitten once and then allowed to regrow. A major goal of that management is to prepare high-quality regrowth for later use during the dormant period. Figure 2 briefly describes our grazing management.

THE COW

My description of what the ideal cow would be to harvest our grass is not intended to be funny, but points out that constant trade-offs are involved in any beef selection program.

From weaning in September until calving in March, our ideal cow would be a 900 lb 1950-model Hereford-Angus cross with lots of hair and 4 inches of fat. Wintering costs are the biggest out-of-pocket expense that we must pay. This type of cow could winter on our grass with little supplement. At calving in March, our ideal would be to drop the Hereford and switch to a 1970-model Angus crossed with a Tarentaise. It would be optimum to stay with the Tarentaise-Angus cross until she was bred in early June. After breeding, our ideal for one month from mid-June to mid-July would be the biggest, growthiest Simmental or Brown Swiss X Charolais cross we could find. At this time of year, we have the strongest feed in the world. This breed combination could really convert it.

From mid-July to weaning in September, we would need to switch back to the Tarentaise crossed with the 1970 Angus to better match the declining forage quality, but still keep milk production at a high level. At weaning we would go full circle to the 1950-model Hereford-Angus cross for maximum wintering efficiency.


GRASS NUTRITIVE VALUE - Manipulated High Desert Bunchgrass
NUTRITIVE REQUIREMENTS-Hereford X Angus X Tarentaise Cows
NUTRITIVE REQUIREMENTS
NUTRITIVE VALUE
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
Cows Calve
Breeding Season
Calves Weaned
The last of the year old grass eaten out to make room for fresh new grass for next 12 mo. useage. Grass quality improving.
Cattle moved to new pasture every few days to prepare regrowth for Sept-March use. Grass quality excellent everywhere.
Cattle put where the grass is best. Moved less often. Youngest animals weaner heifers, FG yearlings and 2 year olds get the best available. High quality grass may be limited.
Figure 2. Converting grass to beef.

This really illustrates the difficulty in selecting an efficient cow. Efficiency in one place is not the same in another. It is certainly not the biggest calf. Unfortunately we can't switch breeds and types within breeds at a moment's notice to suit the changing environment. We are building a three-breed composite for that purpose.

With Tarentaise in our composite, we never again have to worry about selecting for more milk. Most Tarentaise have all the milk our environment will support. A major gain is made immediately when milk production no longer has to be included in the selection program.

Our goal is not to increase average milk production. We want to pull up the lower end and reduce the top end. Tarentaise improve the yield grade of our cattle by about one point by making them leaner and by removing the fat that we have to get off the Hereford and Red Angus which are the other two breeds in our composite. Tarentaise also give us pigmentation to eliminate eye problems and have good teats and udders. Negatives for the Tarentaise are their rather unconventional looks. Because they don't have backfat and because like other European breeds they have been barn wintered for generations, they don't winter as well as the Herefords.

The strong point of the **Red Angus** is their lack of any real bad weak points. That is not a putdown. It is a strong point. They have less real weak points than most breeds do. Calving ease, early puberty and adequate milk production are the strong points of the Red Angus for our operation. Disposition and an occasional dumpy throwback are the main negatives for us.

The **Hereford** breed is the third breed in our composite. We avoid using the modern Hereford because some of the modern Herefords don't winter any better than the Tarentaise. The 1970 models just coming out of the short dumpies and not yet into the long leans are about right for our environment. Herefords have the most generations of adaptability to range conditions, a good hair coat and the ability to lay on external fat for wintering ability. Late puberty, average milking ability and eye problems are their main drawbacks.

Combining the three breeds gives us more length and meatiness than a Hereford-Angus cross but not near the meatiness, growth or frame of a Charolais or Simmental. Excellent teat and udder conformation are also present in our composite.

Our goal from this breeding program is a 1000 to 1050 lb cow that will produce a 475 to 550 lb steer calf at 6 months of age. We have weaned a few calves at 600 lb but have often culled their mothers for failing to breed back in our 60-day AI season. We don't have the environment to support that level of growth. Anything below a 450 lb calf is hurting us as those mothers are loafing and changing our grass into fat on their backs instead of milk for their calves.

IN CLOSING

Our operation is simpler than most cow-calf ranches. Due to our environment we do not have the option of economically raising anything but grass.

All ranches are basically the same in that most of the products to support a beef animal must come from the soil. The cow's only logical function is as a harvesting machine for the optimum crop the ranch can produce. Our environment is harsher than most for a good bit of the year. For a short time, none is as good.

Everyone's criteria will not be the same as ours, but by setting standards, selecting breeds that have a chance to meet those standards, and ruthlessly culling those that don't work, real progress can be made. The relationship between the soil, the grass and the cow is not commonly considered. That relationship is what must be looked at in the future. We have to start thinking about producing something from the soil that someone wants in order to increase the value of our land-based operation. The days of sitting back and letting the land value appreciate are over.

DISCUSSION

QUESTION. What are your cash costs per cow?

ANSWER. We quit looking at cash costs, but if we get $270 for every calf we wean, in 30 years our ranch will be paid for, our kids will have gone to school and we will have eaten and lived in a manner that is acceptable to our life style. Cash costs are somewhere below $100 per cow. We don't worry about cash costs because unless we want to sell the land, only total costs are important to us.

QUESTION. You showed a slide of hormone and antibiotic free beef. What do you do to keep your cows healthy?

ANSWER. Generally we didn't use a bottle of penicillin in a year on 400 cows and 200 yearlings. We seldom treated with antibiotics before we started producing this type of beef, so it's not a problem.

QUESTION. Do you breed back all your heifers?

ANSWER. We breed almost all our yearling heifers. We keep all our females and winter them. That is part of our selection program. We don't feel that we are wise enough to decide by looking at a female calf whether she will be a good or bad producer so we have a 45 day AI breeding season for heifers, with no cleanup bulls. Those that come into heat and breed during that time are our replacement heifers. The heifers culled are usually the larger, prettier animals but they do not fit into our program.

QUESTION. Why don't you use terminal cross sires?

ANSWER. We are on the edge out there. Our environment will barely support the three breeds we have. If we put the added stress on the cow of a bigger, heavier producing calf like Charolais, our cows would not likely rebreed. If we were in an easier environment with these same cows, using a Charolais would be ideal. Another reason is that 400 cows don't produce enough steer calves to make an even bunch as it is. If half were terminal cross, we would have two types requiring two different markets. We have used all types of breeds, to the tune of 20 to 30 calves per year from all breeds you could name. When given a chance to breed as heifers, they would either not conceive then or would leave the herd as open 2 year olds. We have come down to what stayed with our criteria. That doesn't mean our cattle are best everywhere but they are most closely in tune with what we can do with our environment.

QUESTION. What weaning weights are you getting?

ANSWER. Our weaning weights vary from year to year, depending on whether we get rain in the summer which we hardly ever do.

We have weaned calves with steers averaging just a hair under 500 lb at 6 1/2 months of age. A more normal average would be closer to 450 lb. Our cows are capable of easily weaning 500 lb calves if the weather cooperates which it usually doesn't. Weaning is a matter of timing to us, not calendar date. We don't say we are going to wean on October 1 or September 15 of each year. We watch. Within a period of 3 days on the desert, the cows suddenly start going downhill. As soon as we see this starting to happen, we wean. It is otherwise too hard to get any condition back on the cows for them to go into the winter. We attempt to always use this year-round thinking. The calf not pulling the cow down is a lot less expensive for us than having a big calf and a skinny cow that doesn't do well during the winter.

QUESTION. Could you outline your short AI program and method of heat detection without gomer bulls?

ANSWER. When you heat detect 550 females in a section pasture, you have a pretty good idea when you go out, so it's fairly easy. We have bred AI for 20 years and if you do that, you know by looking at a cow that she is in heat. Another advantage is we don't have any streams or water around. Any place where there is enough water for 400 cows to drink, there is a corral. And the cows are geared to come into that corral every day. So actually it is easier to AI in a section pasture with limited water than it is on 40 acres with water running in it. Our cows want to go where we take them.

QUESTION. Why do you run cow-calves instead of yearlings?

ANSWER. We don't have any winter feed so to run yearlings we would have to buy in the spring and sell in the fall, which in our area is not usually a good thing. The people who make it in our country, buy in the fall when cattle are usually cheaper. They have silage or

some inexpensive feed source. The challenge of a cow-calf operation is about the neatest thing that's going.

QUESTION. What do you do with your steer calves?

ANSWER. We have maintained ownership by either feeding our steers through or backgrounding. For several years we weaned them, took them to a custom lot and sold them in March weighing 800 lb as warmed up feedlot calves. We have the genetics that we can produce an 1100 or 1200 lb steer at 14 or 15 months of age. They aren't as growthy as Charolais or one of the better carcass breeds but they are able to be pushed more than a straight British cross. We are presently in a beef marketing project through which we market our cattle ourselves. We had fed them clear through but what we didn't like was being completely at the mercy of either the futures market or free pricing, and the fact that there was no flexibility. The day they gotta go, they gotta go and what are 150 steers to Iowa Beef? It seems like every year we fattened our cattle all the way, the scales were all frozen and backed up and the truckers were on strike. Our steers were fed an extra week or two and ate all the profit. It doesn't have to be that way.

QUESTION. What did you mean by biological type?

ANSWER. Biological type has to do with frame size. As an example, Hereford, Angus and Tarentaise are of the same biological type; Charolais, Gelbveih, Simmental and Maine Anjou are of another; Jersey and Longhorn another. We want to stay with one consistent biological type. Tarentaise is the only European breed we know of that fits with the Hereford and Angus. There are of course extremes in all breeds.

QUESTION. Have you tried the Salers breed?

ANSWER. Yes. We liked their hair. They are supposed to have a disposition problem but the bull we used didn't. As a breed they apparently have that problem. The main problem for use was that they were bigger framed. We had 10 Salers heifers of which only 6 conceived as yearlings and only 3 bred back as two year olds. They just didn't fit our environment.

QUESTION. Is disposition your number one selection criteria?

ANSWER. Yes, particularly with AI breeding. There is just no sense putting up with bad disposition. But it goes along with our philosophy that we really are in a by-product salvage operation in the cow-calf business. We can't spend too much time fiddling around with a by-product business. We must have cattle that can manage by themselves.

QUESTION. How do you market excess females?

ANSWER. That is a real problem because it costs more to get a bred heifer than she is worth. We are pretty heavy on culling just as open heifers. We do sell some bred heifers and pairs and try to sell some older cows. Both steers and heifers are presently going through our marketing plan. Once they get their hair coat off and are hanging in the locker plant, there is not that big a difference between heifers and steers. We ranchers must start thinking about this and stop taking those terrible docks we get for heifers.

QUESTION. What conception rates are you getting?

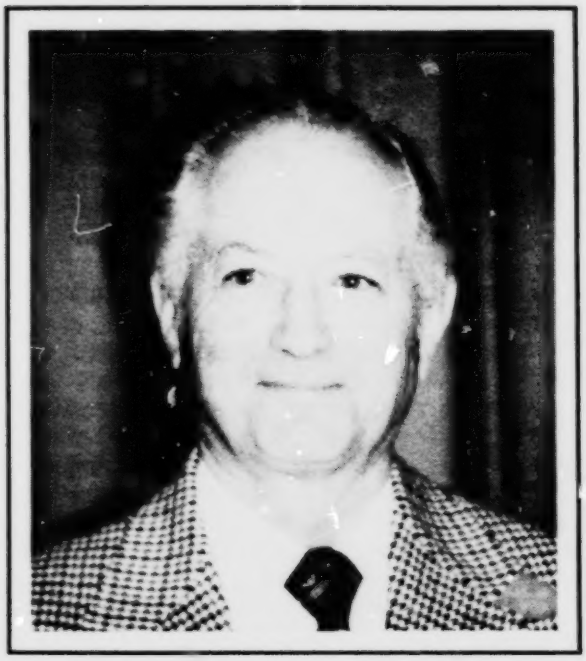
ANSWER. That is a hard question for me to answer because I don't like numbers. I think you can make them say anything you want them to. So I'll give you my hedged answer. We use our AI program as a culling tool. If we have an older cow or a cow we aren't 100% fond of, we only breed her once. But if she can calve during the first 3 weeks of the calving season, we give her a second chance. If she repeats then, we don't breed her. Do you count that as a failure or would she have conceived if you had bred her? We do that fairly frequently. We also deliberately, just barely run these cows on the edge because we are trying to develop a herd adapted to the country.

To answer your question, we get 90% conception in mature cows and 80% in two year olds breeding back at three, which are bred to calve at the same time as the cows. We have been as high as 90% on the two year olds, as low as 75%.

QUESTION. How long a breeding program do you follow?

ANSWER. Not over 60 days and usually 50 to 55 days for cows. This year we bred heifers for only 30 days. With our beef marketing program we may be looking at a longer calving season because we need some different sizes, but a shorter breeding season is necessary to fit our environment.

WHAT IS AN EFFICIENT BULL?



Dr. Bill Cates
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GENERAL

During this discussion, I want to work through a method of finding a more efficient bull. An efficient bull is simply one that causes a high rate of pregnancy in a reasonably large number of cows in a short time. All bulls are not created equal. If we really looked hard to find sterile bulls we would probably find only 5% of the bull population, maybe even 3% at any one time, truly sterile or completely unable to reproduce. I think people use terminology incorrectly. They talk about some bulls with low fertility as if they were partially sterile. I don't accept that. The term sterility should be reserved to mean complete and permanent inability to reproduce. Those kinds of bulls are easy to find. Sorting out the low efficiency bulls is more of a problem.

As long ago as the early 1920's observations were made and recorded in the literature that both bulls and stallions could have varying levels of fertility. In one study (1922) W.W. Williams looked at six Guernsey bulls in a large dairy herd. The bulls ranged in their services per conception from 1.58 to 3.85. Translating that into something more meaningful such as the chance to conceive or the chance that a bull will cause conception in any one heat period, the best bull would have a 60% conception rate and the poorest bull a 21% conception rate. In 1923, W.L. Williams and Savage worked on a big horse breeding farm. Five stallions varied in their settling rates from about 63% to 10%.

This type of valuable information appeared to be largely ignored by livestock breeders for nearly 30 years. Other researchers in that era had described better examination techniques than those that cattlemen want to pay for and use today.

Settling rates or conception rates dictate the length of the breeding season. The full impact of this can be understood by calculating the estimated length of the breeding season necessary for the best and worst bulls from the above mentioned report. The bull with a 60% settling rate would have about 94% of the cows pregnant in 63 days (equivalent to 3 cycle lengths) whereas the bull with the 21% settling rate would require just over 8 months to achieve the same high pregnancy rate. Bulls are definitely different in what they can do as far as affecting the length of the breeding season.

Calculations that describe how conception rate affects the length of the breeding season are presented in Table 1. Bulls with 75% conception rates would take 42 days or two cycles to achieve a 95% pregnancy rate in a 100-cow herd. Bulls with 40% settling rates, which are numerous, would require 126 days to achieve the same pregnancy rate.

The bulls with a 40% conception rate are not sterile. They just have lower reproductive efficiency. If a producer wants to get by with this type of bull, the bull could get up to a 95% pregnancy rate but it would take him 4 months to do so. Various conception rates and the length of the breeding season required with each to achieve a 95% pregnancy rate are presented in Table 2.

Table 1. Relationship between conception rate and length of breeding season.

Days	No. Cows		CR		Pregnant
21	100	X	75%	=	75
42	25	X	75%	=	19
					94
21	100	X	40%	=	40
42	60	X	40%	=	24
63	36	X	40%	=	15
84	21	X	40%	=	8
105	13	X	40%	=	5
126	8	X	40%	=	3
					95

Table 2. Length of breeding season required with various conception rates to achieve a 95% pregnancy rate

Conception Rate (%)	Breeding Season (days)
75	42
60	63
50	84
45	105
40	126

A research group at Colorado State University subjected bulls to as rigorous an examination as they could develop. Their results indicated that the bull:cow ratios of 1:25 or 1:35 were probably not used to prevent bulls from being powered out, but rather to mask the effects of lower fertility bulls in big herds. Even at a ratio of 1 bull to 60 cows, carefully selected bulls could be used to achieve acceptable breeding results.

The second concern is how to identify the best prospective breeding bulls. Vigorously applied breeding stock evaluations are required, which are not necessarily the evaluations we are using today. Breeding stock evaluations should be used as a means of identifying the best breeding stock prospects. Our problem today is that the evaluation system we use identifies and culls the worst bulls but does not find the best bulls. Breeding soundness evaluations are not fertility tests. Both tests are required.

The most important attributes of an efficient bull could be summarized in 3 major areas: 1) Good general health and physical soundness, 2) High serving capacity and 3) Good semen production.

GENERAL HEALTH

Good eye sight is part of general health and physical soundness. The bull must see sexually active females. Behavioral studies in Australia showed that in Australia, the bull does not run around and sniff every cow. He may in a small pasture, but in a large breeding pasture that gets to be a pretty tedious job. General health also includes sound feet and legs so that the bull can easily cover the breeding pasture and contribute his share to the breeding activity. He should be in good body condition. Fat bulls don't make honest contributions to the breeding activity. Thin bulls need to gain too much weight on the breeding pasture.

SERVING CAPACITY

The second major area to be concerned with, which is generally less familiar to cattlemen, is the bull's serving capacity. There are two main components to serving capacity, sex drive and physical coordination.

Sex drive is basically genetic. You cannot give a bull hormones; he has to be born with them. A well coordinated bull seldom injures himself breeding. A poorly coordinated bull often tears his penis and prepuce and has to be taken out of action.

In North America, we have lagged behind the Australians in working out ways to assess serving capacity. We can learn much from them and possibly apply some of their principles to evaluating serving capacity in our bulls. The Australians found that they could use cows that aren't in heat if they were restrained well. In order to test a group of bulls they determined that a pre-test exposure period was required, where test bulls could watch a proven bull perform for 10 minutes. After 10 minutes enough test bulls were released that there were always 1 or 2 extra bulls for competition. Under Australian conditions, a 40 minute test period worked best.

The number of services the bull performed was his score. There was also a good correlation ($r = 0.82$) between how bulls performed on test and how they performed under field conditions.

We have recently attempted to develop a serving capacity test that will work under western Canadian conditions. Oftentimes, the differences in serving capacity among a group of bulls are astounding. It should be noted that if someone wants to do a good job of evaluating bulls, the ability to be a good observer and to keep records is essential.

The Australians subjected 437 Hereford bulls (20-month old) to the serving capacity test and rated them as low (0, 1 or 2 services in 40 minutes), moderate (3 to 5 services) or high (6 or more services) in serving capacity (Figure 1). The majority of the bulls serviced 3 to 10 times in 40 minutes.

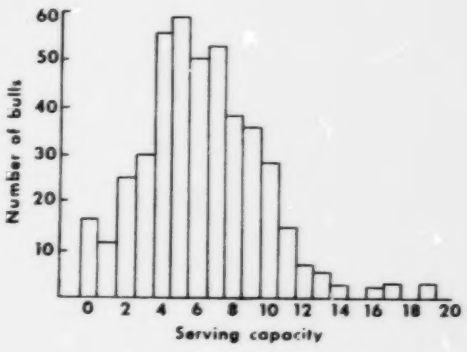


Figure 1. Distribution of Serving Capacity in 437 20-month old Hereford Bulls.

Is there any connection between serving capacity and fertility? The Australian work indicated that among the 437 Hereford bulls they studied, the highest serving capacity bulls had better fertility rates than the lowest serving capacity bulls (Table 3). The highest serving capacity bulls left pregnancy rates of 90 to 100% in a 40 day breeding season while the lowest left 20 to 67% in the same period of time. The Australians used a bull:cow ratio of 1:40.

Serving capacity can be measured and is highly repeatable. A once-only test will predict how bulls perform in the future. How bulls perform in the test situation is how they perform in the breeding field. Serving capacity is related to fertility. It is also moderately heritable (h^2 = 0.67).

Table 3. Relationship between serving capacity and fertility.

No. services in 40 minutes	1st service CR (%)	Pregnancy rate (%)
0, 1 or 2	10-40	20-67
3, 4 or 5	54-65	89-93
6 or more	65-75	90-100

SEMEN PRODUCTION

The third area to assess is semen production. Several things must be considered. Testicular size must be adequate. Testicles must be contained in a normal scrotum. A bull's accessory sex organs and their duct system should be normal. Sperm cells must be determined to be normal, which requires microscopic examination.

The bull's testicular size should be measured at least twice, being sure that both testicles are down in the scrotum. Measuring devices need only be simple. There is no magic in the measuring instrument. The magic is in the person taking the measurements. What you are really trying to measure is testicles. Testicles are covered by skin, subcutaneous tissue and in some bulls by fat. Normal testicles don't compress. The measuring tape should be tightened enough that it pushes aside the skin and fat and measures mainly testicular tissue. By not pulling the tape snugly enough, a measurement error of 2 to 3 cm could occur.

Scrotal shape is important. Bulls do have normal and abnormal scrotal shapes. Normal scrotums have a distinct neck. At reasonable temperatures, testicles are dropped all the way down into the scrotum.

Many bulls have congenital short scrotums. Because they can never fully lower their testicles to handle temperature regulation, they produce more abnormal sperm cells than bulls with normally shaped scrotums.

Scrotal circumferences should not be measured when temperatures are below zero. Scrotal measurements should be taken where and when a temperature of 50 to 55° F can be maintained but if bulls are warmed up, scrotal measurements can be taken at temperatures down to zero.

Scrotal circumference is quite highly heritable (h^2 = 0.68) and half sisters of bulls with better scrotal circumferences reach puberty earlier and cycle more regularly than half sisters of bulls with poorer scrotal sizes.

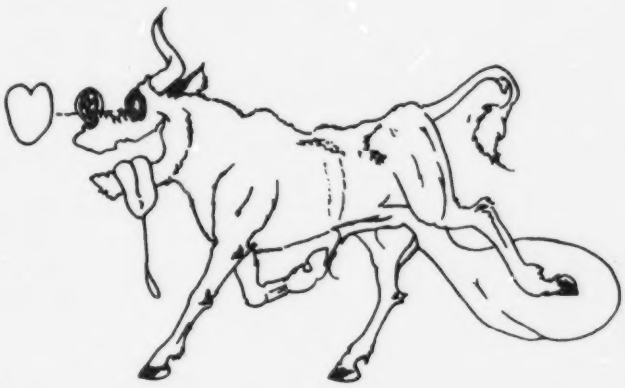
Properly conducted examination and measurement of the bull's testicles by an experienced person is a good predictor of semen quality. We examined 1216 bulls 2 years of age or older to determine scrotal circumferences and relate scrotal circumference to semen quality. With a scrotal circumference of 38 cm or more, 9 out of 10 bulls will probably produce the quality of semen to be satisfactory breeders. Four out of 5 bulls measuring 36-38 cm will be satisfactory. With a 34 to 35 cm scrotal circumference, 2 out of 3 bulls will likely be satisfactory. A bull has a 50:50 chance of passing the semen quality test when his scrotum measures 34 cm.

Inexperienced people have abused this part of the examination so badly that many cattlemen are justifiably confused about the true value of scrotal circumference measurements. The procedure requires a lot of knowledge of testicular and scrotal pathology to decide if the measurement has validity.

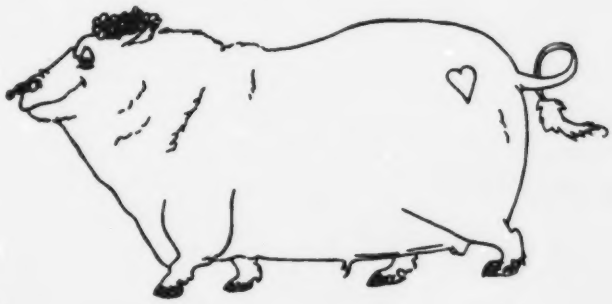
Collection and examination of semen is the last step in assessing semen production capabilities. The best bulls will usually have highly dense, highly motile semen with at least 70% or more normal cells. This part of the assessment should be done by an experienced person who can quickly detect whether a sub-standard sample is a bull problem or a collection problem.

IN CLOSING

Remember, there are bulls with high reproductive efficiency:



and bulls with low reproductive efficiency:



The highly efficient bull is one that has good physical soundness, a high serving capacity and normal, well developed reproductive organs that are capable of delivering a large number of highly motile normal sperm cells. When a bull is selected according to the criteria described, the cattleman will know that he has done all possible to achieve a high number of pregnancies in a short time period.

DISCUSSION

QUESTION: Dr. Cates, why don't you give this talk out in the field? You'll get a lot more response out in the country than you do when you try to bring everyone in.

ANSWER. Dr. Williams and I spent about 18 years running around the country giving beef production short courses. We got to a lot of people and I realize there are a lot more to get to. We are open to invitations now and then if we can fit it in.

QUESTION. When we turn our bulls out on the first of June, if we have a two year old, he'll breed everything in site and the old bull may walk over and lay down. And yet next year we get more calves out of the old bull than out of the two year old.

ANSWER. That's a common observation. It is just the enthusiasm of youth. That is one of the things we have learned from our observations of bulls. For example, yearlings tend to make a whole lot of mounts. If you ever try to do a serving capacity test, don't count mounts. Count breedings or completed services.

QUESTION. When we take our bulls into the university for testing, are results different or affected by whether we are a buyer or seller?

ANSWER. No, because we use the standard test where we do a general physical examination and a semen test. We don't look at serving capacity, which is important. But we are not equipped to do that. And that is the challenge I am throwing out to you cattlemen, to develop a practical way of evaluating serving capacity which will overcome the current deficiency in our present bull evaluation procedure.

QUESTION. Could you briefly outline the breeding soundness evaluation you use. Also, what percentage of bulls would fit into the superior fertility category and how can we adapt that along with serving capacity tests to some of our bull sales?

ANSWER. If you are a purebred breeder you probably won't like the answer. There are very few bulls that will be superior. If there are 5% sterile, maybe there are 10 or 15% that are superior. And there are a lot of bulls in between. That is why I used the example of a bull with a 75% conception rate. With that level, you may have to cut out about half of the bulls now being used. All you have to do is go from a 1:25 or 1:35 bull:cow ratio to about 1:60. If we went to 1:40, we would perhaps cull a third of all bulls. With our present evaluation system, we cull about 20%. A fellow that wants a 40 day breeding season is looking for something a little out of the ordinary.

QUESTION. How would you adapt that to current bull sales?

ANSWER. I wouldn't buy those two year old bulls myself. There are better ways of getting bulls than through two year old bull sales.

QUESTION. I mean all bull sales, not just 2 year old bulls?

ANSWER. My own idea is that the ideal time to select a bull or look him over seriously for the first time is when he is about 15 to 16 months of age. If at all possible, try to fit him into your breeding scheme even a little bit at that age. Then, don't fatten him or let him get too thin. Carry him over to next year and he will be quite a different two year old than the 2 year olds coming out of two year old bull sales.

Bulls should get into the pipeline so that they can catch the tail end of the breeding season when they are long yearlings. At 12 or 13 months of age, they're still not quite there. In that four month period, from 12 to 16 months of age, they go through some real radical changes. Any bull that is going to be anything is clearly showing it at 16 months. You don't have to wait until they are 18 months to determine that.

QUESTION. We presently follow the minimum recommendations suggested by the Society of Theriogenology. What deviation in the evaluation technique did Savage and Williams use where they more positively identified superior bulls? How can those techniques be incorporated into what we have to do?

ANSWER. Start evaluating bulls seriously, especially with scrotal circumference measurements, at 12 to 16 months of age. If they are average or better then, they will no doubt go on to be quite good. If they are about 2 cm below average for the breed at that time, they will probably be 3 and 4 cm below breed average when mature. Of bulls with average or above average scrotal circumferences at 16 months, 90% will likely be good breeders. If they measure 2 cm below average at 16 months, they will likely not be efficient enough and will be culled.

QUESTION. In some bull sales when the bulls are measured and found sub-standard for whatever criteria were established by the bull sale committee, they say that if the bull is semen tested and proves satisfactory, he can still enter the sale. If this happens, what have we accomplished?

ANSWER. I would suggest that if they don't make it, they should be steered. I don't believe in giving bulls another chance after 16 months. If they don't make it at 16 months, don't ever let them get to 2 year old sales. It is not only embarrassing to have a bull culled just prior to the sale, but it is also costly to take him from 16 months to two years of age. Had he been measured at 16 months and found to be below standard, he would have made an A1-A2 carcass then. The culling time should be before he ever gets to be two years old.

QUESTION. Is quantity of semen important?

ANSWER. Don't pay much attention to quantity that comes out with electro-ejaculation. Basically, what people are looking at there is the ability of sperm cells to move around. They check for motion and form. Quantity is unimportant when bulls are electro-ejaculated. Depending on electrical impulses, quantity collected can vary greatly. Even if only one ml is collected, as long as it reveals 80% normal sperm, that is sufficient.

BEEF COW EFFICIENCY: MATCHING COWS WITH RESOURCES

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INTRODUCTION

There is no one ideal beef animal for all production situations. Genetically similar cattle performed differently under two different environments.

BACKGROUND

Combining genetic resources adapted to specific environmental and management conditions is the best potential source of improvement in production efficiency available to commercial beef producers. Cattle must be matched to available management, labour, feed and climatic conditions.

Cattlemen in western Canada have faced a dilemma in that little information was available which compared breeds and breed types under environmental conditions common to western Canada.

In 1969, the Research Branch of Agriculture Canada initiated a comprehensive crossbreeding program under two contrasting environments to evaluate reproductive capabilities and progeny of 10 different first-crosses.

ACKNOWLEDGEMENTS

The results presented in this report were derived from the Foreign Cattle Breed Evaluation project conducted by the Research Branch of Agriculture Canada. The committee members responsible for this project included Howard Fredeen (Chairman), Milton Weiss and Jack Newman at Lacombe, Gunter Rahnefield at Brandon and John Lawson at Lethbridge (Manyberries).

Brandon was chosen on the basis that it represented the type of environment and management common to the central regions of the western provinces. The other location was Manyberries in southeastern Alberta, centered in the semi-arid short-grass plains with range practices common to vast regions of western North America. The locations were very different in terms of management and environmental conditions.

THE COW HERDS

Western range herds of Angus, Hereford and Shorthorn breeding were bred AI to Charolais, Limousin and Simmental bulls to produce the required population of 1000 first cross (F1) females. Thirty bulls of each sire breed were used, so the breeds were fairly well represented. One hundred fifty range bred Hereford-Angus females were purchased to serve as a control population. These crossbred herds were bred AI to one of the breeds other than their sire breed during a 9-week breeding program starting in mid-June of each year. The Hereford-Angus heifers were bred to Charolais bulls. All cows that failed to produce a calf in two consecutive years and those showing extreme physical deterioration in the last years of the study were culled.

THE LOCATIONS

Manyberries and Brandon are very different locations in terms of management and environmental conditions. Brandon is a semi-intensive cultivated pasture type of management. Animals are usually confined in the winter and fed silage or preserved forages. Cows calve in confinement. That represents a wide cross-section of Canada, so results from this study are applicable elsewhere.

Manyberries is an extensive range environment representing southeastern Alberta, southwestern Saskatchewan and parts of the BC interior. There is little day to day management at Manyberries. Animals are pretty much on their own. Cows winter in the open, using coulees for shelter. They calve on the range. Summer pasture is almost exclusively native range.

It takes about 60 acres per cow-calf unit per year on the extensive range environment at Manyberries. It takes one tenth that requirement at Brandon.

Climatic conditions are an additional factor. Twenty years of data on climates at each location were recorded (Figure 1). Brandon receives more precipitation than Manyberries, specifically during the summer. The difference in precipitation between the two locations was expected to be larger than what was observed. Manyberries gets more wind than Brandon but both follow a similar pattern. The combined effect of less rain and more wind makes a much drier climate at Manyberries. Temperature at both locations was similar except during the winter months (December to February) when temperatures were colder at Brandon.

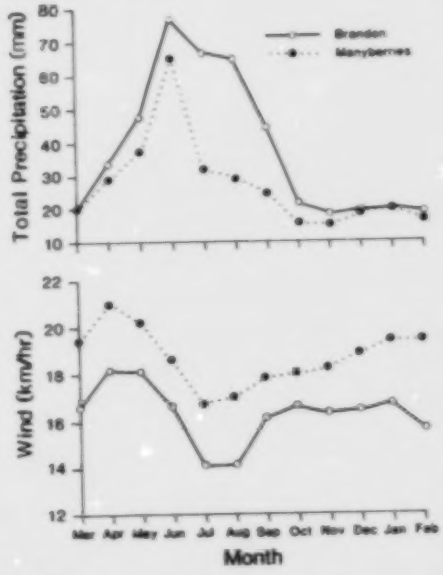

Figure 1. Monthly averages for weather data at Brandon and Manyberries.

RESULTS

With a study as comprehensive as this, involving 10 breed crosses and evaluating numerous factors, results presented as actual numbers would be difficult to interpret. Breed cross and location comparisons in this report are presented in the form of histograms or bar charts that allow a visual comparison. The Hereford-Angus (HA) control herd represented the base or zero line in most comparisons. The performance of the other breed crosses was calculated as a percentage greater or less than the HA, much in the same way that an index is calculated. For example, the weaning weight of the HA is represented by the zero or base line. If a breed weaned heavier calves than the HA, the bar representing that breed will be above the base line. If a breed weaned calves lighter than HA, their bar will be below the line. The relative performance of each breed cross is revealed by the height of each bar. Breed differences are easily visualized this way. It is much simpler than storing and sorting numbers in your head.

This study compared breed crosses in terms of beef cow efficiency, a term ambiguous in itself because efficiency means different things to different people. Most cattlemen will tell you that their idea of an efficient cow is one that weans the most pounds of calf, eats the least and stays in the herd the longest. Such a definition brings many factors into play.

Pounds weaned will depend on the reproductive and mothering ability of the cow, as indicated by conception rate and weaning rate. Calf viability and growth potential will also influence weaning weight. Cow longevity is an important factor because replacement females cost money directly if purchased or indirectly by reducing the number of marketable offspring available when heifers are held back as replacements.

When cash costs enter the picture, producers readily agree that winter feed requirements represent their highest out-of-pocket expense. If a certain combination of genetics and environment can lower this cost, efficiency can be improved.

Some 'efficiency' factors are more important to some producers than others, depending on their environment and available management, labour and feed. Because of this, breed efficiency was defined in a number of ways in this study. One comparison, for example, was of weaning weight per calf weaned; another looked at weaning weight per cow exposed for breeding; another energy requirements per lb of calf weaned. It is interesting to note that the breed rankings for efficiency often changed when efficiency was defined differently. This suggests that producers must decide which factors are most important to their particular operations before they choose a breed or breed cross to use.

General Location Effects

The cow herd at Brandon had lower cow mortality, higher conception and weaning rates and higher calf weights at weaning than the herd at Manyberries. These factors had a cumulative effect. The average weight of calf weaned per cow exposed for breeding was 16% lower at Manyberries compared to Brandon.

Cow Growth

Growth of the heifers at Brandon was rapid prior to first calving followed by large winter weight gains until maturity. At Manyberries, large gains were made during the summer months and large weight losses occurred during each winter period. At four years of age, cows at Manyberries weighed 30% less than those at Brandon. Cows bred while nursing weighed less and gained less than those not nursing at breeding time.

Location differences in cow growth patterns were most extreme when the Manyberries herd was wintered under range conditions. The herd responded to improved winter conditions but never gained in condition to a level equal to their counterparts at Brandon.

Cow Losses

The majority of cow losses at both locations resulted from culling for failure to conceive. Few cows (3.5%) were culled because of extremely poor physical condition. More cows died at Manyberries than at Brandon due to the severe winter conditions of 77-78 and 78-79 at Manyberries that affected the 2-year old Simmental cross heifers in particular. They entered the winter period in thin condition, having weaned a heavy calf. The first year of the maintenance study to examine winter feed requirements began in the fall of 1977. It was found that NRC recommendations were not adequate and the Simmental group in particular suffered many losses.

Mortality varied among the different breed crosses (Figure 2). Charolais-Angus crosses recorded the lowest losses at both locations. At Manyberries, Simmental-Shorthorn had the greatest mortality . At Brandon, the Limousin-Shorthorn group suffered the most losses. This reflected the high number of animals within these breed crosses, which were the heaviest milkers, that were culled as open females.

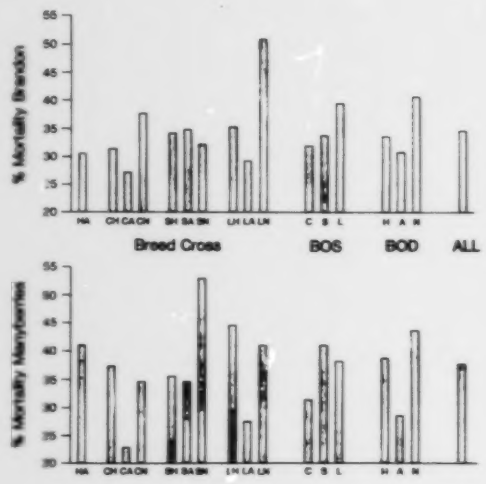

Figure 2. Cow losses by breed cross, breed of sire (BOS) and breed of dam (BOD) compared with Hereford-Angus.

Conception Rates

Conception rates of Charolais-Angus and Simmental-Shorthorn cows were higher than the HA cows at Brandon. All other breed crosses had poorer conception than HA which averaged a conception rate of 82.9%. Five crosses at Manyberries (Charolais sired, Simmental X Hereford and Limousin X Hereford) had better conception rates than the HA cows which averaged 77.8% (Figure 3).

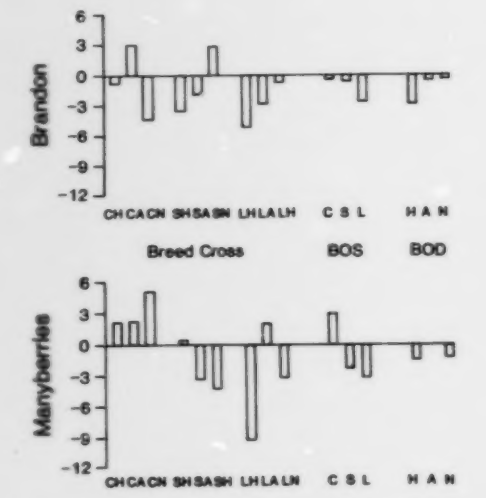

Figure 3. Conception rates by breed cross, breed of sire (BOS) and breed of dam (BOD) compared with Hereford-Angus.

Weaning Rate

Weaning rate accounts for calf viability and survival as well as conception. When weaning rate rather than conception rate was considered, the breed ranking changed (Figure 4). Charolais-Angus which had about 3% better conception compared with Hereford-Angus at Brandon were similar to Hereford-Angus in weaning rate. Charolais-Shorthorn had the highest conception rates at Manyberries but ranked second for weaning rate. Charolias-Hereford had better conception rates but poorer weaning rates than Hereford-Angus at Manyberries.

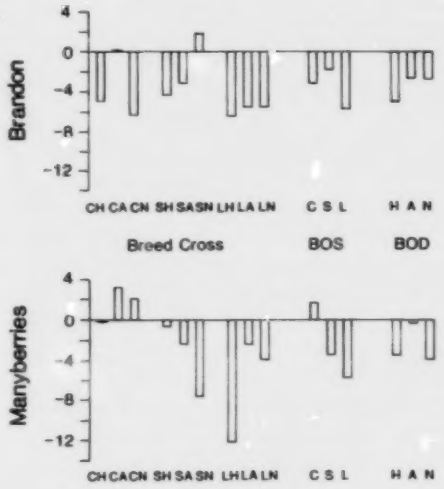

Figure 4. Weaning rates by breed cross, breed of sire (BOS) and breed of dam (BOD) compared with Hereford-Angus.

Weaning Weight

At both locations the lightest calves at weaning were those reared by the Hereford-Angus (455 lb at Brandon and 415 lb at Manyberries), as indicated by the absence of any bars extending below the base line representing the HA. Generally, Simmental sired calves had the heaviest weaning weights per calf weaned at both locations (Figure 5). Dam bred had a lesser effect on weaning weight, especially at Manyberries. At Brandon, cows from Shorthorn dams produced the heaviest calves. At Manyberries, cows from Hereford dams had a slight advantage.

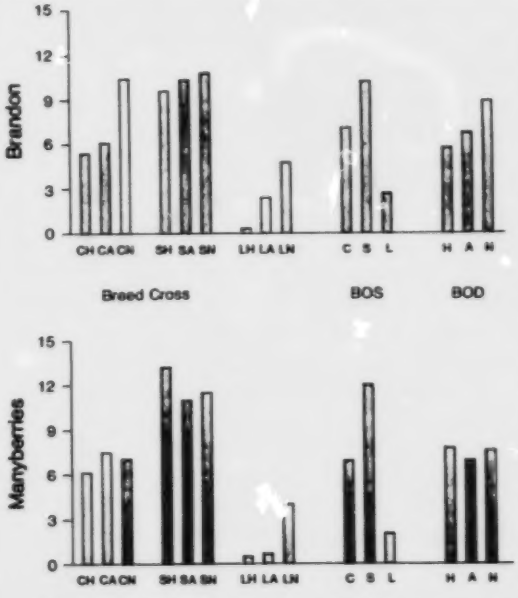

Figure 5. Average weight of calves weaned by breed cross, breed of sire (BOS) and breed of dam (BOD) compared with Hereford-Angus.

Weaning Weight Per Cow Exposed

Weaning weight per calf weaned is not an adequate measure of production since it does not consider conception rates and calf mortality. Weaning weight per cow exposed for breeding accounted for those factors and changed the breed ranking. Hereford X Angus cows weaned 356 lbs and 298 lbs of calf at weaning at Brandon and Manyberries, respectively. At both locations, Limousin-sired cows generally weaned less pounds of calf per cow exposed for breeding than did Hereford X Angus cows. The superior cow crosses at Brandon were those by Simmental sires or out of Shorthorn dams. Superior cow crosses at Manyberries were those by Charolais sires or out of Angus dams, which was a different ranking than that based on weaning weight per calf weaned.

Lifetime Productivity

When cow replacement costs were considered as a factor in evaluating productivity, breed rankings changed again. In this study, the herds were maintained without replacement. By considering weight of calf weaned annually per cow entering the herd, longevity was measured. A cross would wean more pounds per year per cow entering the herd if more cows stayed in production longer. Most durable were those crosses sired by Charolais bulls or out of Angus dams while the shortest lifespan was associated with cows sired by Limousin and out of Shorthorn dams (Figure 7). It is interesting to note that the Simmental-Shorthorn cows which performed well at Brandon (22% better than Hereford-Angus) averaged marginally less (1.4%) than the HA at Manyberries.

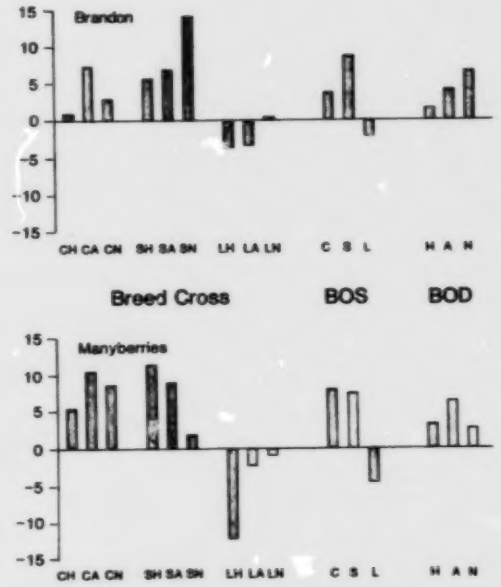

Figure 6. Weaning weight per cow exposed to breeding for breed crosses, breed of sire (BOS) and breed of dam (BOD) compared with Hereford-Angus.

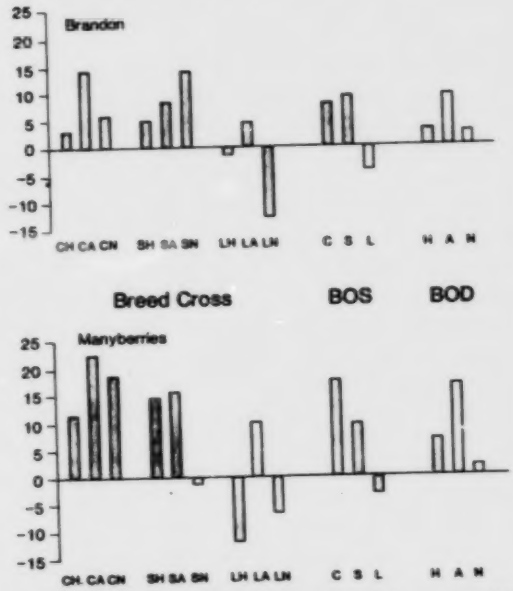

Figure 7. Weaning weight annually per cow entering herd for breed cross, breed of sire (BOS) and breed of dam (BOD) compared with Hereford-Angus.

Winter Feed Requirements

Breed cross differences in feed requirements for winter maintenance were evaluated over a period of four consecutive years beginning in the fall of 1977. Minimum daily feed allowances were estimated on the basis of NRC standards increased as required to prevent or reverse any loss in cow condition. NRC recommendations were not applicable to conditions experienced in Southeastern Alberta. Cows at Manyberries were fed 20% more energy than NRC recommendations. This increase was not enough to maintain body condition. When feed inputs were increased by 42% the following year, problems of cow mortality, calf vigor and conception rates were corrected and average cow weight and condition increased (Figure 8). The cows at Manyberries never carried as much fat cover as those at Brandon. During the winter feeding period, cows at Manyberries gained more weight relative to size than those at Brandon. Whereas cows at Brandon gained condition, those at Manyberries lost condition.

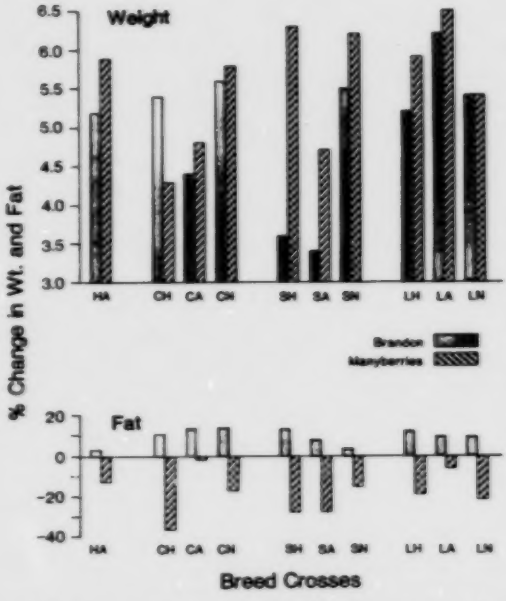

Figure 8. Location differences in percent change in weight and fat cover for breed crosses.

Breed cross differences in average weight resulted in differences in their estimated daily feed requirements. The lightest cross was the Hereford-Angus. It was expected that if feed requirements depended on bodyweight, the larger bodyweight of the various other crosses would be matched by a proportional increase in feed requirements compared to the Hereford-Angus. There were many exceptions to this. For example, Simmental at Brandon were 7% heavier in initial weight and 5% heavier in final weight but received 10% more feed than the HA (Figure 9). At Manyberries, Limousin-Angus were about 2% larger than Hereford-Angus but required 5% more feed. Charolais-Hereford and Charolais-Shorthorn were 17% larger than HA, but required only 14% more feed. This indicated that breed differences in feed requirements existed apart from differences due to bodyweight.

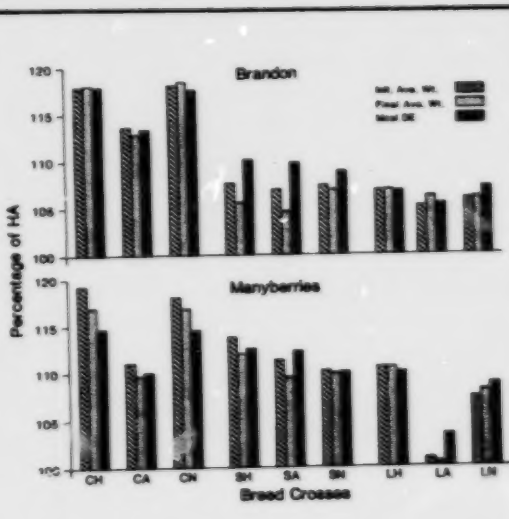

Figure 9. Body weights and energy intake of breed crosses compared with Hereford-Angus.

Cow Productivity and Efficiency

Meaningful estimates of cow efficiency must relate feed inputs to productivity. Productivity was measured as the weight of calf weaned per breeding exposure during the cow's life in the herd. Cow efficiency was defined as the feed energy (Mcal digestible energy) per kg calf weaned.

Overall, cows at Brandon were 36% more efficient (18.79 Mcal DE per kg calf weaned) than cows at Manyberries (25.58 Mcal DE per kg calf weaned). Breed crosses ranked differently at the two locations. The smallest breed crosses were not always the most efficient at either location (Figure 10). Although Hereford-Angus were the smallest and required the least amount of feed during the winter, other breed crosses weaned more pounds of calf and required less energy per kg calf weaned.

At Manyberries, Charolais and Simmental sired cows weaned heavier calves per breeding exposure during the cows' lifetime than Hereford-Angus. Yet these crosses more efficiently converted energy intake into kg of calf weaned than the HA did. Limousin sired cows required more energy per kg calf weaned but only Limousin-Shorthorn cows weaned more kg than HA. Crosses involving Charolais or Simmental sires and Angus dams were the most efficient at Manyberries. At Brandon, Simmental-Angus cows were the most efficient. Charolais sired cows with the exception of those from Hereford dams were generally more efficient that HA. Of the Limousin-sired cows, only LA were less efficient than HA at Brandon, weaning less kg calf and requiring more energy per kg weaned.

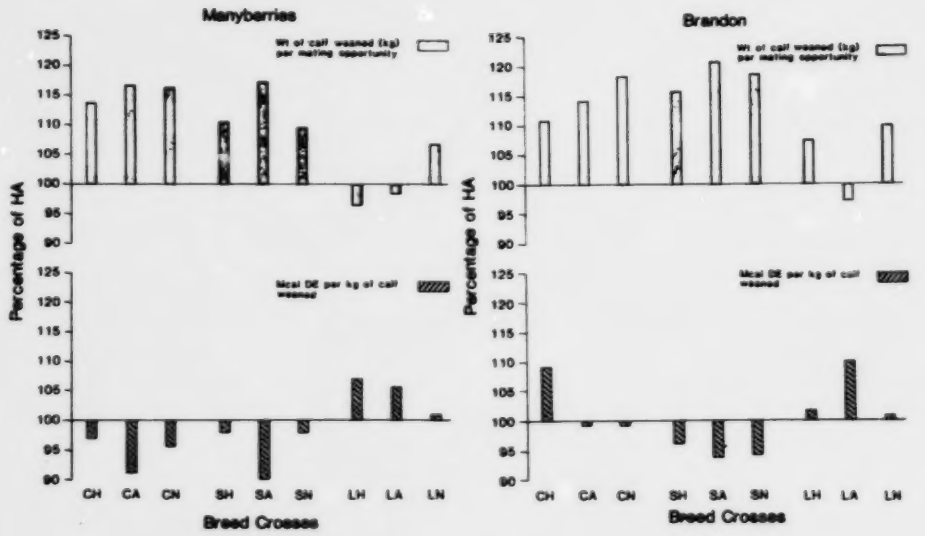

Figure 10. Cow productivity (kg weaned per breeding exposure per lifetime) and cow efficiency (energy per kg calf weaned) for breed crosses compared with Hereford-Angus.

IN CLOSING

Genetically similar cattle performed differently at different locations. Breed cross rankings for productivity and efficiency varied depending on how these traits were defined. For this reason, no one breed cross was ideal for both locations. When producers use these results in decision-making, they must first decide which factors are most important to their particular situations. For example, weaning rate which measures both cow fertility and calf survival may be more important to a producer operating under extensive management conditions than to one who has the available time, facilities and labour to assist with calving. The efficiency with which a beef cow converts feed to pounds of calf weaned may be less critical when feed supplies are home grown and plentiful than when feed has to be purchased. Because resources are both human and environmental, each individual has to match cows with resources. Breed crosses are different. It is more economically feasible to match cows with resources than to change the environment.

In the 16 years since this project began, the sire breeds studied have become more numerous and have undergone genetic change in Canada. New breeds have made their debut on the Canadian scene and have greatly expanded the breed-cross options available. The specific breed-cross combinations documented in this project may not be fully relevant to the present day beef industry but the principles identified that describe factors contributing to lifetime reproductive efficiency are relevant to all beef production programs.

Studies of winter feed requirements clearly illustrated that the NRC recommendations for daily nutrient requirements of beef cows have no application is southern Alberta and Saskatchewan. We recommend an additional 30 to 40% daily allowance above NRC requirements in these types of environments. Feed inputs were directly related to body size, but breed differences in feed requirements existed apart from those due to differences in bodyweight. When consideration was given to productivity, small cows were not always the most efficient. Breed crosses with high milking potential, particularly those that produce calves with above average genetic potential for growth will suffer themselves to the demands of their calves. As a consequence, they will enter the winter in below average condition. Failure to compensate for this lack of condition by increasing winter feed inputs will decrease conception rates the following summer.

The challenge to individual beef producers is to match a breed or breed cross with their environment or, alternatively, to ensure that the winter management (specifically feed energy inputs) provided will meet the genetic potential of the chosen breed or cross.

DISCUSSION

QUESTION. Would you say that pounds weaned per cow ME requirement is the bottom line measurement we should be looking at?

ANSWER. That depends on whether you produce or purchase your forages. If forages are plentiful, it is not as important. If you buy forages, it will cost you a lot more for some of these breed crosses. Pounds weaned per energy requirement of the cow is a good measure depending on your own resources. Some producers have a lot of feed available on a yearly basis. So those people aren't looking at weaning weight on the basis of feed dollars. If you buy feed, then it is a valid comparison. If you can reduce winter feed costs by changing breed or breed combinations, it would certainly be worthwhile.

QUESTION. We hear a lot of talk about selecting a breed for our specific environments. Where can we get unbiased information on particular breeds, other than from breed societies?

ANSWER. This report gives you comparisons among breed crosses. You can contact the Agriculture Research Station in Lethbridge for any information about this study. It was very comprehensive. I presented only a portion of the results.

QUESTION. Will this project be carried one step further into feedlot performance?

ANSWER. Yes. Feedlot information should be available by early summer. There is only one phase remaining, which is the carcass evaluation of the animals finishing this summer. Results I presented today were only the first phase in the project, which involved half-cross animals. Three-quarter and 1/4 cross cows were also evaluated.

QUESTION. I live in northern Saskatchewan where feed is generally not a problem. I suppose my environment is more similar to that at Brandon than Manyberries. Which cattle are best for me?

ANSWER. In a word, first-cross Simmental sired animals born to Angus or Shorthorn dams. Don't forget that these nine first cross combinations were further evaluated. For example, each cross would in some years have been bred to Limousin, in other years to Charolais or Hereford.

QUESTIONS. Are there plans for a financial analysis regarding longevity, buyer preference and salability of culls?

ANSWER. Yes. The first draft of a financial analysis has been written. All those factors are being evaluated.

QUESTION. Has there been any work done regarding the hardiness of the Galloway or Scottish Highlanders?

ANSWER. That was done about 20 years ago, but the information is still applicable and can be obtained.

MEASURING COW EFFICIENCY

Dr. Jim Wilton
Department of Animal & Poultry Science
University of Guelph
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BACKGROUND

The cows involved in our research on the effects of cow size and milk yield on efficiency weren't out on the range. We are running an all-confinement system. We're working on stored feeds year round. That is an important concept in understanding and interpreting these results. Some results you may find to be relevant and some will have to be interpreted relative to the way these cows are being handled. We have been looking at cow size and milk yield for quite a number of years now. I won't have time to go into all the results by any means. I will primarily concentrate on putting some dollars and cents values on the results we did get.

We had obvious examples of cows that differ in milk yield. We had some Jersey-Angus cross cows and some Herefords typical of the 1970's era rather than the 1980's. Charolais-Holstein had about the same amount of milk yield as Jersey-Angus but a little more size. Our cows ranged from 600 to 1600 pounds in bodyweight.

What was unique about our situation is that we measured the feed intake of each cow every day of its life. We had the disadvantage that we could only do this in confinement but we did have the advantage of actually having been able to measure feed intake. Each cow was equipped with a device around her neck which enabled her to open only one gate to the feed trough. We allocated the feed to the cows each day, feeding according to requirements. This is another important aspect of our research that I will be coming back to. We fed cows according to what we estimated they should need based on their size, their milk yield capabilities and their age. Young cows got more feed than older cows because they needed that extra energy for growth.

The cows were housed in pens of six. We grouped them according to their size and milk yield capabilities. Pens were relatively small so the cows didn't get much exercise.

All cattle were bred AI which is relative to the results achieved regarding reproductive performance. We ran a 42 day breeding season. We calved in the spring and rebred in the summer. All cows got two chances to conceive. We used a gomer bull that circulated from pen to pen, which was quite effective but did require extra labour and time. Our 10-year average conception rate was in the range of 80% and better. All cows calved together. Heifers were not bred to calve earlier than cows.

All potential replacement heifers were bred. We didn't make any judgements about heifers until they had been given a chance to breed. We occasionally culled one or two that had health problems or were particularly small. That was the only culling we did prior to breeding. We tried to calve out a fairly high number of replacement heifers. In our case, we wanted to put as many cows through our program as possible. We accepted a much higher replacement rate than many commercial producers would, but one that is comparable to purebred operations where it is important to get new generations into production quickly. Our annual replacement rate was approximately 30%.

We have run two major projects. One covered a wide range of crosses. We are presently working with three distinct breeding programs. One is a straight Hereford which serves as our control. The second is a Charolais-Simmental-Maine Anjou cross, which is a big cow and in general is considered extreme. We are trying to push the upper limit to see how far we can get. The third rotational cross we are using is a Gelbveih-Pinzgauer-Tarentaise-Angus.

The second project we are running involves embryo transfer. Although not generally common to commercial production, under some circumstances this procedure is an intriguing possibility. Much higher productivity per cow can be achieved, but it does require much more management. When we look at cow efficiency, we should also be looking ahead into the future. We should look at our production programs and at matching our management and production programs with the types of cattle and types of breeding programs we are going to follow. Although embryo transfer is extreme, if you have a good level of management that can provide proper nutrition, then embryo transfer is one way to certainly change the level of productivity per cow and in fact the quickest way I know of.

It is important to determine what the consumer wants at either the feedlot level or ultimately the retail level. The work presented here refers to an end point of marketing cattle when they are at the Al level of finish, about 7 mm of fat cover. Another factor that has to be considered in looking to the future is whether or not 7 mm of fat cover is going to be the best level of finish. When I was in 4H, we were taught to judge an animal by how blocky it was and 2 inches of fat cover over the ribs was considered best. We have come down from that level to 1/2 inch of fat cover and now we are talking 3/10's of an inch of fat cover over the ribs. We may well be talking 1 to 2 tenths of an inch as the desired level of finish in the near future.

One of the problems we had with some of the more extreme types of cattle we evaluated was that they had to be kept on feed a little longer. Although some cattle finished at 900 lbs, others did not finish until well over 1500 lbs. We had some losing-value animals at both the upper and lower limits.

COW SIZE AND MILK YIELD

Because I will be discussing beef cattle efficiency, a definition of that term is in order. Efficiency is ultimately a dollars and cents measurement. In this project, we started by looking at a fairly simple economic definition: returns less feed costs. Returns are derived from the sale of market animals and cull cows. Feed costs are those pertaining to the calves, cows and replacement heifers.

To determine the effects of cow size and milk yield on returns, we based comparisons on 1983 average prices, balanced for a 14 year running average to ensure that we were using a stable beef price relative to feed costs. The critical factor is looking at the price of beef relative to some long term factor rather than making breeding decisions based on the price of grain today. Quite different decisions would result.

Tables 1 and 2 describe what would happen if we changed cow weight or milk yield. We looked at these effects in terms of 4 types of enterprises: 1) a cow-calf operation, 2) a feedlot, 3) an integrated operation which would involve maintaining ownership of the calf until slaughter, and 4) an integrated plus situation where the dock in prices for underweight and overweight carcasses, an overhead charge in the feedlot and some change in carcass value in terms of retail yield were considered.

Table one is relative to animals in a production situation where there are limits on the numbers of animals. This would be similar to looking at a cow-calf pair. It would also be an appropriate comparison for a 50 or 100 cow herd where the main factor was the number of cows that could be handled.

When the effect of cow size and milk yield were determined on enterprises where numbers of animals were limited, returns definitely increased with cow size. As cow weight increased, returns increased. The extra feed the larger cows ate was paid for by the extra weight of calf sold at weaning per cow-calf operation, and by the extra weight of the animal sold at market in the case of the feedlot and the integrated operations. Increasing milk yield had a similar effect on returns. The extra feed eaten to maintain higher levels of milk production was again paid for by the pounds of calf produced at weaning time. The milk yield effect of increasing returns was evident in the integrated operation as well. There was also a positive response in the feedlot to milk yield which was not statistically significant but nevertheless existed and had some value.

Table 1. Change in returns less feed costs ($) for limited numbers (per animal)

	Per 100 lb cow weight	Per 5 lb/day milk yield
Cow-calf	7*	15*
Feedlot	15*	13
Integrated	16*	42*
Integrated plus	24*	39

* significant at the 5% level

Table 2 presents changes in returns examined in a different manner. When feed supplies were the limiting factor to herd size, results were somewhat different. Some believe this to be a more realistic approach than merely looking at numbers of animals but it depends on your own particular management situation. When feed supply was the limiting factor, increasing cow weight was associated with reduced returns to the feedlot. When the

progeny of bigger cattle entered the feedlot, returns were less. These animals were heavier, ate that much more feed, were on feed longer and just didn't pay for themselves. This result was very dependant on the way the comparisons were made relative to our assumptions about the feedlot operation. Under the assumption that the feedlot operated continuously, we used an overhead cost based on all phases of the feedlot full at any one time. Results would change if the feedlot was a once-a-year operation, only filling at one time. Changes in returns due to increasing milk yield were very small. Numbers in Table 2 are larger than in Table 1. Table 1 refers to change in return per cow whereas Table 2 describes changes per farm. The important factor is that if stocking rate is decreased because bigger animals require more feed, then you have that many fewer cows and it is pretty much a toss up as to what effect milk yield will have on returns.

Table 2. Changes in returns less feed costs (4) for limited feed supplies (per farm)

	Per 100 lb cow weight	Per 5 lb/day milk yield
Cow-calf	120	40
Feedlot	-1630*	-990
Integrated	-20	60
Integrated plus	550*	530

* significant at the 5% level

Table 3 summarizes changes in reproductive performance per 100 pound increase in cow weight and per 5 lb increase in milk yield per day. Feeding according to requirements is an important component of these results. The only place we saw any real difference in reproductive performance was with our bigger cows reaching puberty later and being older at first calving than smaller cows. When we fed according to requirements, cow size and milk yield did not affect reproductive performance, mainly because we were able to get the extra energy to the larger cows when they needed it. That is something all producers have to relate to their own operations.

Table 3. Changes in reproductive performance

	Per 100 lb cow weight	Per 5 lb/day milk yield
Age at 1st calving	5	.05
Service per pregnancy		
Cows	.01	-.001
Heifers	.02	.006
Days for start of breeding to pregnancy		
Cows	.4	-.1
Heifers	.2	.4

In summary, with limited numbers in all sectors (cow-calf, feedlot, and integrated) increasing cow size has a positive effect on returns. If feed is limited, increasing cow size may have a negative effect on returns to the feedlot operation. In an integrated operation where more economic factors are considered, increasing cow size has a positive effect on returns. If cow numbers are limited, it is beneficial to have more milk. If feed is the limiting factor, the effects of milk yield tend to cancel out.

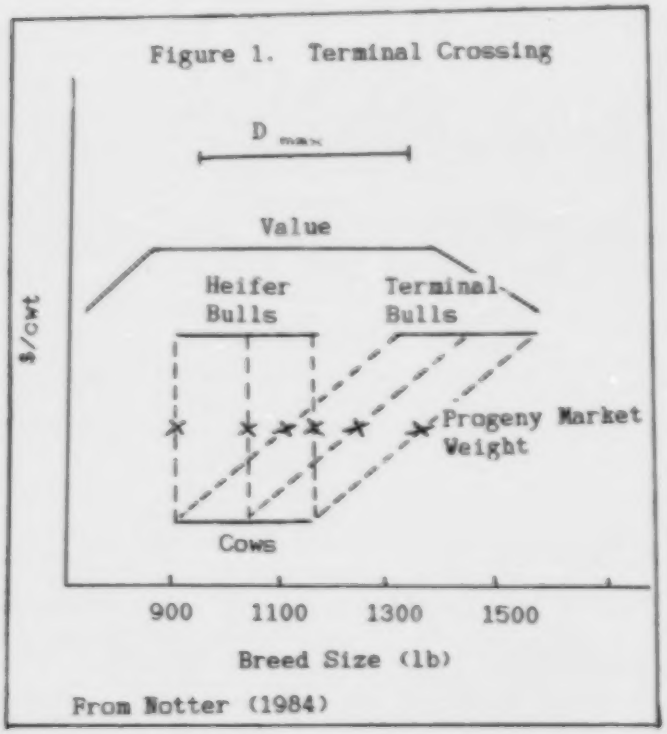
It would be difficult to make general statements based on these results. We have to look at specific

operations. We must also go on further and look at what we can actually do in a positive sense in terms of cross breeding and selection. But in general, we want to have cattle as big as we can handle under the market place that we are dealing with. We want to have as much milk yield in our cows as possible. Under most circumstances increased milk yield will have a positive effect on profitability.

CROSSBREEDING AND SELECTION

Before looking more specifically at what can be done in terms of cross-breeding and selection, there are several important points that should be discussed in terms of terminal crossbreeding. Different cow sizes and different terminal sire sizes were compared by Dave Notter (Figure 1).

Figure 1. Terminal Crossing



From Notter (1984)

Terminal bulls were used on cows of different sizes and the progeny were marketed half way between. This is an important point. If we are talking about crossing programs, there is a definite relationship between progeny market weight and cow weight. At the top of Figure 1 is a value that relates to discounting for underweight and overweight carcasses. Valid arguments are raised as to what the acceptable market weight range should be. The maximum difference (D max) between the size of the cow and the size of the sire in terms of breed characteristics should be about 400 pounds. A larger difference would likely result in calving problems. We exceeded that limit in our efficiency work, but it was the quickest way we could get more genetic material into the calf and change the dollar return.

It is one thing to talk of cow efficiency but when cow efficiency is to be measured and different breed crosses are to be characterized, looking at specific components of cow efficiency is more useful. What types of components can actually be measured?

Size

It is important to define market weight. A useful concept is to look at market weight in terms of weighing bulls that come out of bull testing programs at one year of age and measuring their fat ultrasonically. This is commonly done in our bull testing program. We are developing a system in Ontario that estimates what the AI finished weight of bulls would be based on their weights on test, growth rates and ultrasonic fat measurements. This helps us predict how the progeny of these bulls will perform and estimates what weights their progeny will get to when they reach AI finish. We can no longer hope to sufficiently change carcass characteristics by selecting for growth rate alone. We have been relying on this very much and have made some significant changes in the finish of animals at typical market weights. Now we are at a point where we have to define the market weight and try to change the efficiency with which the animals get to those points. The first

thing we then have to do is try to identify where these animals will finish. We can do this reasonably accurately through our measurements of bulls at the end of test. We have carried animals through to finish. Our estimates of the time required to finish and of finishing weight have been 90% accurate.

We must avoid falling into the trap of looking at cow size and bull size as such. It is sometimes tempting to do. Rather than look at the size of our cows and bulls per se, we must consider the size of the product they produce, our market cattle, at the time they are sold. Although biologically impossible, it would be nice to have cows stop growing as soon as they reach an adequate size to produce a calf. We would like to have bulls stop growing too. What we want is a market animal that can gain, arbitrarily and for arguments' sake, at a rate of 6 lb per day up to 1200 pounds, which would get it to market well under one year of age. This level of performance is possible. We have some animals on test that are gaining nearly 6 pounds gain per day now. All there is left to determine is whether they will finish.

Growth Rate

Growth rate measurements will still be important, but relative to market weight rather than by themselves. Growth rates within the group of animals that are going to meet the desired type of market weight will be important. Growth rate has been successfully measured at bull test stations for quite some time and fairly effectively in stations with proper adjustment periods and proper management programs. There are some station tests that won't work where the age range of the bulls is too large or the adjustment period is too short.

The relationship between the performance of bulls and their sons or calves in the ROP program is quite strong. One thing we will determine is the EPD or expected progeny difference for gain.

Feed Efficiency

An area open to argument is feed efficiency and its measurement in bull test stations. I know some of you people in Saskatchewan have had a go at measuring feed efficiency in your Hereford Program. One of the things we have been looking at further to that is to really account for feed efficiency within this framework of going to a given market weight. It is very important to make allowance for the weight of animals going on test and the composition of the gain. There is a whole re-appraisal going on about the advantages of looking at feed efficiency. It will be quite a useful tool within the framework of looking at these animals coming up to a particular type of market finish.

Milk Yield

I have a few suggestions regarding milk yield. Within the herd, which is where we primarily look to change milk yield, weaning weights are so far our best measurement of milk yield. At the research station we milk our cows on three occasions during the time they have calves at their sides. Milking beef cows is acceptable for research purposes, but in terms of practicality weaning weight is more useful. Expected progeny differences for the maternal components of milk yield and growth will become popular. With more sophisticated computing and statistical methods, we are able to separate out the milk component from the growth component. This will be quite useful to purebred breeders to change their own breed and to commercial people to change the characteristics of their animals. Using EPD's in selection can be effective because they are moderately heritable (h^2= .27 for milk and .30 for growth components). When the

relationship between milk yield and dollar returns is considered, actual weaning weight is still our best predictor.

IN CLOSING

These are some ideas about how we might apply some programs in terms of selection within defined crossbreeding programs such as rotational crossbreeding or terminal crossbreeding. Selection will be quite different in terms of how we look at changing animals within each of these programs. It is important to determine where breeds fit into crossbreeding programs and what characteristics should be emphasized in purebreed programs so they fit into crossbreeding schemes. We must look at both crossbreeding programs and purebred programs.

In terms of fitting the cow to the environment, I think we should not just look at fitting the cow to the environment, but should consider developing a full package. We can change our management programs. Pasture management, for example, is an area of huge development potential. We cannot close our minds and just change the cow to match the environment. Today, let's develop a full package. Within that full package framework, I hope I have given you some ideas on how that can be accomplished.

DISCUSSION

QUESTION. Feed is provided to bulls in test stations for maintenance, secondly for growth and lastly for fattening. We fool ourselves if we believe we can run feedlots under the guise of being test stations, and utilize all the information that allows you to present this data. The bulls coming out of test stations that feed for very high gains may not be reproductively sound. I don't think what you describe should be done in the test stations themselves. If you want feedlot data on a bull he should be progeny tested.

ANSWER. In the first place, we do have to have bulls coming out of the stations in the sort of condition where they can do the job in terms of breeding. We don't want their reproductive capabilities impaired. On the other hand, we have an opportunity to take bulls up to one year of age and find out something about their growth capabilities and whether they're going to be good sires or not. In addition we have the opportunity of finding out what their fattening potential would be. I personally think we will probably be better off to determine those traits in yearling bulls than we would be to choose them just on the basis of their growth rate and then wait and get a progeny test because of the great time delay and the cost involved in getting progeny information. The balance we have to strike is between getting animals to show how much they will finish and getting animals too fat that they will be impaired reproductively. I think one thing useful is that we can look at this program as serving two purposes. Bulls that get fat before they are one year of age on a reasonable energy ration, that is over Al finish, are not the type of bulls you would want to use in breeding programs at any rate. So we get rid of them on two counts, because they are probably reproductively damaged by that stage and because if they get that fat that quickly we would not want them for breeding purposes.

The problem we have to come to grips with is how fat can we get those bulls and what type of energy can we put into them. At this stage, I am opting for challenging these bulls. I don't think the bulls that are challenged on a reasonably high energy ration and given a chance to grow are going to be damaged. They are going to be the types of bulls that can still go out to the breeding pasture at 15 months.

QUESTION. We've already had previous speakers allude to the fact that 2 year old bulls at that level of fat are damaged reproductively. Won't yearlings be damaged too if we challenge them to the point where we can determine their finishing capabilities?

ANSWER. That is why I say that the important thing is to define what the level is going to be where we start getting reproductive problems. Certainly we are not talking the degree of fattening that Dr. Cates was referring to in terms of two-year old bulls. I think that is a thing of the past, to look at that level of finish. We are looking at yearling bulls that to me will be in good condition, but they don't have to be excessively fat. If they are excessively fat on an energy program that gets Hereford bulls up to 3 pounds a day gain, I don't know if they are the type of bull you would want to use anyway. The only question I would put in there is relative to your crossbreeding program. I would not necessarily say that was the selection criteria for all people for all purposes. For example, you may want an easier finishing bull if you are going to produce crossbred heifers to be used under fairly severe conditions. So there can be a bull for that type of animal. I think this is not a question in terms of level of finish but I think we have to challenge bulls enough to find out how much finish they will have. We can't rely just on growth rate as a reasonable selection criterion anymore.

QUESTION. You assume we are dealing with terminal breeds in bull stations. We aren't. Basically we are talking about crossbreeding programs so the information you are trying to generate probably isn't that important. As a matter of fact, it may be the opposite.

ANSWER. Yes, but you have to produce the information so that you know what the characteristics are. What is the point of running a bull test program if you just produce bulls that can be used in breeding herds because they are reproductively sound? That also has no point. The bulls have to be challenged enough to tell something about their growth rate, which is generally done. We have gone that far but probably should go farther and identify other characteristics.

QUESTION. You suggested chances of hurting reproductive function are pretty remote under those circumstances. I would disagree, and suggest it would depend on the biological type you are dealing with. I would suggest that the reproductive function of Herefords, under those conditions, is already being affected.

ANSWER. But that is the issue that must be resolved. What level of gain can you achieve in different breeds before you get to the point of having reproductive damage, but are still able to measure something like finishing ability and feed efficiency? I think it is possible to find that level.

QUESTION. Regarding the sire and dam differential of 400 pounds. That seems narrow compared to western cattle breeders choices of breeds.

ANSWER. Notter's numbers were in terms of a 1200 pound cow bred to a bull of a breed that had cows of 1600 pounds. It wasn't the bull at 400 pounds more, but the breed.

FALL CALVING

Louis Baudin, Rancher
Edson
Alberta

INTRODUCTION

Anyone selling fall weaned calves weighing 600 pounds should perhaps stay with spring calving. Like a mechanic once told me, if your engine is running good, don't tamper with it. But if you're having a problem, fall calving, or late-summer calving as I like to call it, might be an option. I have had nothing but good come from switching to fall calving.

CALVING

When my cows calve, they are in the best of condition and their calves usually are too. The cows pick their own place to calve on clean grass, are rarely interrupted and are able to keep to themselves for the first while with their newborn calves. When a calf is born, its mother gives it her full attention. I never have to help the calves nurse.

I assist about 1% of my mature cows, those that have had one calf or more, with calving. Some years I never touch them. Last year I had one calf with a hind foot turned back. I do most of my checking from my truck or trike. That's about all the attention they need. Another advantage of fall calving is more daylight hours which makes checking much easier.

My replacement heifers run with the cows and are bred at the same time as the cows. After two months on the grass with nothing to do but get into shape, they calve easily. I calve my heifers separately because they need a little more attention. I check them twice a day; the cows only once a day. When spring-calving heifers, I had to pull a lot of calves and many heifers didn't accept their calves. Since I switched to fall calving, I've never had one

heifer that wouldn't accept her calf or let it nurse. I assist about 4% of my heifers with calving. Three years ago I calved out 26 heifers and never assisted one. Two years ago I assisted two of my heifers. Last year I assisted one of thirty.

I have been fall calving for 14 years and have never given a needle to a calf out in the field. I have never had any scours or pneumonia.

RE-BREEDING

At the end of October I bring the herd in, castrate the bull calves and Ralgro all the calves. I turn the bulls out for breeding on the first of November. They have been on the grass all summer, are in the best of condition and are raring to go. By now they think maybe they're supposed to be steers.

By the first of November, the cows are still in good condition, but I ensure that a good quality pasture is available for the cows in October so that they get all they want to eat prior to breeding. If pasture is not adequate, cows should receive supplemental feed. Flushing is a common practice with spring calving and should be with fall calving too.

My replacement heifers are bred to calve at 2 years of age. I think it is important that heifers not be bred to bulls of other breeds for their first calf. I try to breed my heifers back to their original breed.

I find conception rates are much better in my herd since I switched to fall calving. Last year 94% of my cows, including the heifers, calved within three weeks.

CREEP FEEDING

As soon as the snow falls I bring the cows into a creep area where I feed them all winter. I start creep feeding the calves immediately. My creep area is about 50 feet square. The entire front section is made up of gates for the calves to enter. Two self-feeders are inside. They hold a six-week supply of feed. I fill them up for the calves and feed the cows around it so that the calves remain close to the cows. It is amazing how quickly the calves begin to creep feed.

I must emphasize that creep feeding is a must with fall calving. Everyone has had a late calf that has wintered. In the spring it's long haired and its dam is skinny. You think it was because the calf nursed all winter, but there is something you never really noticed. That poor little calf was only eating scratch. If he had been fed he wouldn't have pulled down the cow and put that stress on her. From my house I often hear my cows bawling for their calves. The calves are just too full and too lazy to get up and nurse. So it is very important to creep. Fall calving cannot be done otherwise.

Cold weather has never really been a problem. During an extremely cold winter of minus 40 degree temperatures a few years ago, I started adding a little oats to my creep ration of choice hay. When it was so cold, everyone I saw wanted to know how my calves were doing. I said, "Hell, the calves are doing all right, it's the cows I'm worried about. They're freezing." The calves had that thick hair coat, were full and were just laying there with frost on their backs.

I hear the remark all the time about winter being the most expensive time to feed my cows, especially because they are nursing. I spring calved for 22 years and always fed my cows 20 to 25 lb hay per day. I gradually shifted over to fall calving, which I don't recommend to anyone. If you're going to switch to fall calving, switch the entire herd immediately. But I still feed my cows 20 to 25 lb of hay per day. My theory is that there is not much difference feeding the calf behind the cow or inside her. I have never fed my

cows grain. I don't believe in that. I figure if I have to grow grain for my cows, I'm in the wrong business. Grass is the cheapest thing you can grow. Sales prices for hay may be low, but we never consider what that hay crop does for the soil.

WEANING

Another advantage of fall calving is that you can wean anytime you want. I wean after the first of March. The calves have their rations and know how to eat. When I wean them, I just pull the feeder into the corral and keep the calves on that same creep ration. With fall weaning, calves are often gaunt and bawl a lot. My calves still bawl some but they are full. At dinnertime, the same feeder is there and they go and eat just like they always did. It works well.

I have weaned a month ahead of time when I was running short of feed for the cows toward spring. Once a calf is weaned, it doesn't take much feed to keep a cow.

When I wean my calves, I keep them in the corral for 5 days, during which time they receive their same creep ration. On the sixth day when I turn them out to pasture they are really happy to have their freedom and they forget about their mothers quickly. The same can be said about the cows. When they are turned out on the grass, they are so happy to be there they forget about their calves in a day or two. A lot can be said for spring weaning. I think is it much less stressful for the calves. When calves are weaned in the fall, they lose their freedom when they are confined for the winter.

IN CLOSING

At weaning last year, my steers averaged 579 lb and my heifers just over 520 lb. Two steers weighed over 750 lb at weaning and 1100 lb at 15 months of age. I originally started with purebred Herefords and later introduced some Simmental blood. I think an ideal cow is a 1/4 Simmental-Hereford. The environment is too hard on a lot of the exotics. With that, I'll close. If you have any questions you'd like to ask, I'm just raring for that.

DISCUSSION

QUESTION. What kind of creep feed do your calves get?

ANSWER. Through November, December and January, I feed a mixture of 800 lbs of oats, 200 lbs supplement and 1100 lbs good quality hay. After three months I cut the grain and supplement in half so the calves don't get over-fat.

QUESTION. Why do you think you're heifers don't have any trouble calving?

ANSWER. Well, you being a lady, you should have heard by now that when you're pregnant you should get a lot of exercise. I think that's it.

QUESTION. Are there any disadvantages?

ANSWER. You tell me, that's why I'm here.

QUESTION. Can you share bulls with neighbours who spring calve?

ANSWER. Yes. That's another advantage. There are hundreds I don't even know of yet.

QUESTION. How much does it cost to feed those calves for the winter?

ANSWER. Doc Hatfield, you said you don't go too much by cost. Well, neither do I. I know winter feed is expensive, but I don't think it matters which animals you are feeding, pregnant cows, or nursing cows and calves. I don't think there is much difference in my feed costs. I still have the same acres of pasture more or less and the same acres of hay more or less and it is

still working. I used to run a hog operation along side my beef cattle operation. My wife always said I was making my money with the hogs. I couldn't really argue with her. Five years ago my oldest son got married and took over the hog operation, which is now totally his. So for five years now we've been living off the cows and I have as much trouble with income tax now as I always did. So if anyone says you can't make any money with cows, I don't believe them.

QUESTION. Don't you have any trouble with the calves' ears or the cows' udders freezing?

ANSWER. I used to spring calve and had more frozen ears and tails then, because they were wet. My calves born in the fall are dry. And I hear a lot of cattlemen who 'spring' calve in January and February. Those cows have a big bag and the calf is not likely nursing all the teats. So they get cold. When cold weather hits my cows, they have already been nursing for some time. Their udders are small.

QUESTION. What are your yearling weights?

ANSWER. I always sell my yearlings before December. Last year, they averaged just under 900 lb.

QUESTION. What month do your cows actually calve?

ANSWER. Mid-August to late September. Any sooner, and the calves are too big in the fall, not quite big enough to wean but too big to suck all winter.

QUESTION. Do you ever sell replacement heifers?

ANSWER. No. Most of my cattle are sold to a feedlot. The same feedlot has bought my cattle now for years. I don't like to finish my cattle. To me, grain is expensive and finishing a 900 lb steer is risky business. Its not so risky for a feedlot operator who does it year round.

QUESTION. What do you do with your yearlings during the summer?

ANSWER. Yearlings are in a separate pasture. Replacement heifers are moved close to home before calving. I want them close because they need a little more attention and are easier to check close to home. I separate them because they would be pretty hard to spot in a herd of 130 or 140 head.

QUESTION. Do you have any trouble with the cows and calves wanting to get back together when you first wean them? How far apart are they after that 5 day period in the corral?

ANSWER. That is the trick. I have the cows and calves at least a half-mile apart. Any closer, and I would likely have to keep the calves in the corral for 10 days or longer. Another thing is that the herd is enclosed all winter with an electric fence. They really respect the wire by spring.

Bull control is also important. I only run the bulls with the cows from the first of November to the middle of December. I'm planning to shave a week off of that. My bulls also respect the electric fence. A tip is to wire the inside of a corral when you first bring a new bull home. You'd be surprised at the results. Doesn't take him long to learn what an electic fence does.

QUESTION. Do you run steers and heifers together after weaning?

ANSWER. Yes, but I don't like it. Heifers are pretty calm but the steers can get pretty goofy. Last year I sold them a month ahead because they got so bad. They were running around so bad I said what the hell, the price is good. I couldn't believe how quietly the heifers behaved after that.

OPTIMUM MAINSTREAM CROSSBREEDING: AN EFFICIENT BREEDING PROGRAM

Jim Leachman
Leachman Cattle Company
Billings, Montana

INTRODUCTION

We have all been involved with different crossbreeding systems that perhaps have not accomplished what we had hoped for. Many of these systems were not successful. A uniform product could neither be predicted nor produced with two different kinds of bulls breeding the cow herd. Many crossing programs have gone too far for the environment or the market place. As producers, whether commercial cattlemen or seedstock producers trying to meet the needs of those commercial cattlemen, many of us have had to re-evaluate some of the things we were doing and find different ways to more efficiently breed cattle.

I do not want you to dwell too much on the names or breeds of beef that I will refer to. I am not here to sell them. If I can challenge the ways that you have thought about cattle breeding for the last 20 years and if you can take one idea home and apply it to your own operation, then I will have been successful. No matter how scientific or progressive an idea is, for you to take it home it has to be workable and profitable.

What I will describe is an OPTIMUM MAINSTREAM CROSSBREEDING (OMC) system. We have been developing a simple, better way to crossbreed. We have taken breeds that we thought were too big or too extreme and brought them down towards the middle. We have taken breeds that were too small and brought them up towards the middle. We hope to produce the types of cattle that will fit your environments and market places.

We have exhibited cattle at the Denver Stock Show for the last 25 years. For the first time we did not win a single blue because we didn't show a single animal. We took an exhibit of 22 head of cattle to that show which is comparable to your Regina Agribition.

Among those 22 head were five different breeds that were not extreme for size or height. The five breeds could not be distinguished from one another. They were all solid colored, polled, moderated and modified.

CMC OBJECTIVES

1. Optimum, not maximum, growth, milk, heterosis, complementation and carcass yield.
2. Compatible production and market parameters.
3. Optimum resource utilization for maximum net profit.

An objective of our system is to optimize, not maximize, economically important traits. The industry has been in a mode of operation in which years have been spent trying to maximize growth. A current fad of many geneticists is to maximize heterosis. As the industry gains exciting tools such as Expected Progeny Differences which accurately predict the amount of milk that our lines have, we have people trying to maximize milk production. My guess is that we are currently entering a mode to maximize leanness. The key is not to maximize, but to optimize.

Our second objective is to develop a system that will work on your farms and ranches, that will fit the environment, and at the same time be compatible with the needs of the feeder, the packer and the consumer. I know your grading system is different from that in the US. If you were a group of American cattlemen I would propose to you that one of the greatest things about the choice quality grade has been that the sister-mates to the steers that graded choice with an acceptable market weight have been cattle that worked day in and day out on the range.

There is the chance that those two first needs, the environment or production need and the market need, can be compatible.

Finally, we are striving to optimize the use of resources we have for maximum profit. I even hesitate at putting the word maximum with profit because year in and year out, people who try to maximize profit may often take undue risks.

We have been going down the road a hundred miles an hour with our cattle. Just because you buy a car that can go 100 miles per hour doesn't mean that you have to drive it that fast. If you do that and if you take your eyes off the road, your chances of having a wreck are great. Just because your cow can have a 100-pound calf does not mean that that is the optimum level or speed to push her. If she has a leg back or some other calving problem, there is no room for error. But our industry has been in a mode of bigger and bigger.

OMC METHODS

1. Use of three or more lines.
2. That are phenotypic look-a-likes.
3. Loaded with trouble-free convenience traits.
4. From performance oriented maternal breeds.
5. That are Moderated Purebreds and/or Modified HybREDs.
6. With sensible, on target, performance levels.

Our proposed system has some guidelines. The use of 8 breeds would result in the maximum heterosis attainable. We suggest the use of three breeds, through which about 87% of theoretical heterosis can be attained. Secondly, we suggest that those breeds of cattle be somewhat phenotypic look-a-likes. If they are phenotypic look-a-likes, the lack of uniformity, the great variation and all the management problems that you would have by trying to put a jet engine into a golf cart can be avoided. As kids we could take a Chevy engine and put it into a Ford because they were somewhat similar. It was not a hard conversion. But that is not what we have been doing in the cattle business. We have been trying to combine breeds that were too far apart.

If I am given the opportunity of buying a race car that won't idle when I pull up to the stop sign, that has no conveniences, no air conditioning, no heater, that is stripped and is made for speed, or a second car that will go just about as fast but is efficient and comfortable and has accessories, I will buy the second car. I think there are lines and breeds of cattle that will provide the accessories or convenience traits. Those are the breeds we suggest be used.

One of two types of cattle must be used in our continuous crossbreeding program to achieve the established goals. Either moderated purebreds or modified hybreds must be used. As an example, if bulls of any of the Continental breeds are used on females from Hereford dams and Angus sires to produce replacements which are also bred to bulls of one of the Continental breeds, experience says that the cattle produced will likely be too far out for the environment and market. But if that purebred or fullblood has been bred under a different discipline with a different goal than to make it bigger or taller, it may have been possible to have a continuous crossbreeding program that would not result in an extreme product.

If moderate purebreds are not available, hybreds may be used in the breeding scheme. Part of the problem with crossbreds has been that the traits combined in the crossbred were too diverse. If the breeds used were phenotypic look-a-likes, that problem would have been eliminated. The use of modified hybreds provides an additional advantage that can best be described by an example. One customer we sell to had Hereford cows and used Angus bulls. The animals were working for him but were running out of heterosis. I suggested a Simmental bull, one that had been moderated, one that was part Simmental with the input on the Simmental side moderated, polled, and solid colored just like the dam who was of another breed which happened to be Angus. That hybred bull will produce offspring for that customer that are still half Angus. He can then use a modified Salers-Angus bull and will never move too far and never have to consider using a Jersey or Longhorn to correct his situation.

Finally, we suggest using sensible **performance levels**, whether they be weight, grade or EPD's. Our system is analogous to hunting. When hunting, you don't brag about how far you hit above the target or below it. What is important is how often you hit the target. There are targets for us cattle producers to shoot at. The important thing is not how far we hit above those targets, but how close we hit them and how often we hit them and how efficiently we hit them.

A car could be bought or built that was capable of high speed. But what is important is how it will perform within the speed limit. In my opinion, most of the purebred seedstock in North America are already too big. When they are combined with each other in your cow herds, they overshoot the target. If we are in a period of time when we need to be low-cost producers to survive, why are we trying to produce cattle that need more inputs of capital and labor to overshoot a target?

CMC RESULTS

1. Uniform, predictable, manageable, targeted offspring.
2. Cowherd of comparable biological types (Complementation) with genetic diversity (Heterozygosity).
3. Cattle matched to resources.
4. Growth comparable to terminal crosses.
5. Simple, low cost, trouble free management.
6. Sensible birth, market and mature weights.
7. Flexible, easy adjustment methods.
8. Emphasis on efficient duplication versus costly changes.
9. Option of keeping and/or selling replacement heifers.
10. Accumulation of additive effect of superior sire selection.
11. Whole production available for replacement selection or slaughter.
12. Greater selection pressure due to less attrition.
13. Maintain minimum level of Angus blood.
14. Avoid dead end terminal schemes, incompatible matings, incompatible matching of resources, moving too far, and costly back-stepping corrective measures.
15. Indirectly develop own composite, custom tailored to own operation.

As a result of our breeding discipline, the sixth generation Simmental cattle we have at home cannot be distinguished from hybreds. They all look alike. Our purebred Salers haven't been bred to see how tall they would get, but have been polled and moderated. Our purebred South Devon and Gelbveih hybreds are phenotypic look-a-likes that contain genetic diversity and genetic breed complementation but, again, are somewhat compatible.

Our Simmental heifers are similar, whether they are half blood or purebred. Just because you go from a half blood to a purebred does not mean that you have to make those cattle more extreme. As you are well aware, the Simmental breed, which is a great breed, is under stress in many parts of this country. In the spring of 1986 we sold our kind of Simmental bulls as easily and as well as any bulls we have ever raised because they were modified and moderated.

Our yearling heifers, which represent four breeds, are managed together. I don't need different pastures to manage them. I don't need different labor or feed inputs. They work for me and they will work for my commercial customers. They are **manageable.** We thought that we would not live long enough to put what we call the convenience traits into many of the other breeds, so we used our Red Angus foundation to put in pigmentation, small teats, good udders and freedom from prolapse. As a result we can have a purebred cow of another breed with those **convenience trouble-free traits.**

What are the results of such orientation and what things might help you in your own operation? This different way of looking at things can produce a **uniform predictable product.** If you have an EPD and you know what heterosis does, you can take an animal of one breed, combine it with another, and determine genetically where it will come out and whether you are on target.

We bring heifers on in an early-maturing breeding period. Our heifers finish calving before the cows ever start. We start breeding many of those heifers at 12 months of age. If they do not settle under that management scheme, they are culled. Failure to conceive is our only selection criteria for replacement heifers. One group of our heifers came off the grass in September weighing just over 940 pounds. They were fed a finishing ration for only 63 days. Seventy-seven percent graded choice or better, with 94% producing a yield grade 2 or 1, which is comparable to Canada Grade A1 in yield. There were some purebred Simmental in that group that graded prime yield grade 2 and others that graded choice yield grade 1. The genetics are available to produce cattle that will have the leanness that we will definitely need and also the eating quality that we may have to come back to someday.

In the US, there are literally hundreds of producers trying to find a niche in the market place. These heifers went into such a program and returned some 20 cents above current market price. I sold those heifers live to a feeder on the west slope of Colorado. He bought me a case of wine for Christmas. How many of you have sold cattle to your feeder and had him buy you a case of wine? They returned some $400 to me conventionally. In 63 days, my feeder converted them to $770 cattle. Those heifers were not terminal cross cattle. They did not score 6, 7 or 8 for frame size. They were cattle of the **type that would work in a breeding herd under range conditions.** They had all the performance, yield and quality that the industry needs and they were on target.

It is interesting what a breed of cattle with a very small genetic base can do. In the Canadian sire rating program Black and Red Angus are produced, raised and compared together. The Red Angus breed, which has mandatory performance in the US but a very small genetic base, has four out of the top six weaning weight bulls and 6 of the top 10 yearling weight bulls. In the US, Red Angus cannot compete in the show ring with Black Angus because they are not as tall. But on the meaningful racetrack of commercial beef production, Red Angus can outperform their Black counterparts. I am not here to sell you on red cattle. I am merely stressing the point that if you have a program based on **meaningful performance that is keyed towards the market weight and for the environment,** those kinds of results can be obtained.

Crossbred cows of different breeds give heterosis but are still compatible. A group of my cows representing 5 breeds are run together. I don't have the crossbreeding problems that some of you have experienced and neither have my customers.

Another result of such a system can be a much simpler, low cost system with less management requirements. It is possible to produce cattle with few natural resources. One of my customers from the west slope of Colorado has a herd of black-baldy heifers that he bred to a Salers-Red Angus hybred bull. All his calves look exactly alike, except half of them are black because the cows are black. The color differences are explained by the simple dominant-recessive relationship of black and red coat color. No one can say his calves or black-baldy cows were inconsistent. But chauvinism rears the minute you try to sell a hybred bull. The cattleman with the black-baldy cows will never get too far - by using a Salers-Angus or Simmental-Angus modified hybred bull, he will maintain 50% Angus in his crossbreeding program.

You pick the breed that works for you. If you're a Hereford breeder, then you need to move a little but you don't want to move too far. A Simmental-Hereford bull could be ideal. I would propose that some of the best cattle ever produced in this country in the last 20 years were out of the herds with half-blooded or 3/4 bulls. In the United States, there were thousands of half-blood or 3/4 Simmental bulls that were used successfully. Today, Hereford breeders will not use a Simmental bull because the Simmental have moved too far away from the Herefords.

Our heifers and cows are balanced. We took 1300 cow-calf pairs and put them in an 11,000 acre pasture with two men and two interns we hired for $400 each. The men had horses, three portable corrals and a 6-mile electric fence that they used to try to keep those cows within about 4,000 acres. There had been no supplemental feed since February. There was no flushing. No marker bulls were used. The cows were not brought into corrals because we try to keep them spread out. With no synchronization, 90% of the cows were pregnant 55 days later.

One reason why those cattle conceived was that they were not 30 pound EPD cattle for milk. They had a little milk, a little growth and a little heterosis. They were balanced and they could perform. If you had taken one of the high powered cows with too much growth or too much milk or too much heterosis and put her up there for breeding, you'd have had one of the biggest wrecks you ever saw.

Under our breeding system cattle are not being used that are developed under a scheme to make them bigger and bigger. For that reason, birth, market and mature weights can be kept in line. I would predict that in the near future, American cattlemen are going to be told very specifically what market weights should be and I would guess those to be 675 to 725 pound carcasses, with a maximum of 800 pounds. American feeders and packers are absolutely tired of the variation they are getting in cattle. In the chicken business, chicken carcasses are all the same and are processed much more easily. There will still be small niches for cattle that are bigger and for cattle that are smaller but they will not be capable of handling the tons of beef that we produce and that the consumer eats.

I do not understand the purpose of trying to make breeds of cattle purer. Most breeds in this country, from Europe or from any other place, started as composites. Purity never did anything for anyone in the cattle business. If you're not all tied up in purity, you will have flexibility. If my market tells me that it wants 800 pound cattle, my target will have moved. With my breeding system, I am capable of changing the genetics in my herd to meet that new target.

For many years I have been faced with the fact that somebody told me I had to change my cows. In the production business, one of the most costly things to do is to change models.

In car production, shutting down and starting up again every year to produce new models would not be efficient. What is wrong with recognizing our best cattle and just duplicating them? In my opinion, an efficient breeding system should be more involved with duplication than with change. Change is required if the environment changes, if scientists prove its necessity or if the market place dictates it. But when an animal fits the environment and hits the target, change is not important. Hitting that target accurately, consistently and efficiently is important.

I have a customer just south of the border who faced a severe drought in 1985 and had to sell down his cow herd. The cows he sold averaged $100 above market price because they were recognized as maternal cattle that could be replacement cattle for someone else.

There are periods of time when replacements can be purchased more efficiently or cheaper than they can be produced. However, the acclimation of cattle, if only from farm to farm, has a dramatic affect of the productivity of the cattle. It takes about two years to acclimate purchased cattle to my particular environment so that they produce the way I would expect. If bulls developed under our philosophy are used, they provide an accumulative factor for building a cow herd. If a line or breed can be purchased that will run that close, there is no need to consider anything else.

To survive year in and year out in the long run, you need to keep as many options open as possible. You need to be able to keep your heifers or sell them either as replacement cattle or as market cattle. Heifers produced in our breeding scheme can be both replacement and market cattle. Some complicated breeding programs are based on breeding a small segment or part of the herd maternally for replacements and the other part as terminal. I believe my cow herd to be good, but I need every single cow and every single calf to come up with enough quality replacements to make the kind of progress that I want. If cattle are based on convenience traits or trouble-free traits such as pigmentation, small teats, good udders and freedom from prolapse, then you may be able to make some progress with your cow herd selection-wise. But if open cows, cancer-eye cows and cows with broken down udders have to be culled, every replacement will have to be kept to maintain a constant cow herd. There will be no room left for selection. If 1% or 5% does not have to be culled for bad udders or cancer eye, that provides room for selection. Other traits can then be concentrated on. I call them convenience or accessory traits. Seedstock cattle have the accessories built in and can be purchased at no additional cost for the convenience traits from the optimum mainstream crossbreeding system.

By following such a system, extremes and adjustments back to target can be avoided. Minor adjustments can easily be accommodated as the environment or market dictates. Cattle produced under such a regime are more compatible.

In the long run, my customers who are using modified, moderate bulls that are purebreds or hybreds end up developing their own composites. Their composites are custom made for each set of management and marketing conditions. The three-way rotation many of us are accustomed to will provide about 86% of the theoretical heterosis attainable, which is about the maximum. To obtain 97% heterosis, the use of 8 breeds would be required. Heterosis attained in composites is nearly equal to that from a 3-way rotational program. One factor in the mathematical formula for heterosis is the number of breeds in the composite. That is why composites can produce as much heterosis as 3-breed crossbreds.

What I'm telling you defies everything that cattle breeders have learned in the last century. But our cow herds and our customer's herds are proof that it will work. And some of the biggest institutions in this whole industry are doing it. Clay Center is spending much of its resources on developing composites. Miles City, where the Line One Hereford was developed, is today developing composites. Composites are uniform and predictable.

TO SURVIVE INDUSTRY CHANGE

We have been talking about efficient breeding systems. We are at an important intersection. I think we are at a stage where this industry will change and will change more in the next 5 years than it has in the last 100 years. That can be exciting if you're going to lead it but can be disastrous if you fight it. I want to leave ten words with you that I think will describe the breeding program to survive that change.

You will have to be on **TARGET**. Again, it's not how big your cattle are or how much they weigh at weaning, but how they fit the target commercially for the environment and the market, or if you are a seedstock producer, how your cattle fit the needs of your buyers. You will have to be scientifically based. There are data, surveys and questionnaires to tell you what target you need to hit.

You can no longer walk around and say you have the best cattle. You're going to have to prove it. You will need **DOCUMENTATION**. Not only will you need ROP data, but you will need whatever system it takes to make that data usable in the field for decision-making. When you sell cattle, that information will have to be in a presentable form that your buyers can use.

You will have to be **DISCIPLINED**. I didn't get the kind of cattle I've described today without using discipline. I have violated it at times but have regretted doing so every single time. If you decide that you want cattle that weigh 1200 pounds and yield grade 2 at market time, and if someone offers the best bull you've seen with qualities such as durability, structural correctness and capacity, but weighs 3000 pounds, that bull will not fit your model and should not be used in your breeding plan.

You will need a product that is **DIFFERENTIATED** commercially or seedstock-wise. Personally, we have decided to make our cattle pigmented, polled and moderate. Not everyone wants that kind of animal, but for the people that do, our operation is one of the few places they can find it. And there are enough of those people to buy every single animal that I raise. I have built my own niche.

You can try to make all the progress you want in some trait, looking for that bull with extreme fertility or growth, but many things can only be handled by **CULLING**.

In many traits you can do more by the number of cattle you cull out at the bottom. Your management systems should be self-cleansing. You should manage your cattle in such a way that you don't overcompensate for the environment. With good management, every single calf can be saved or born alive and calving difficulty will be perpetuated. If cattle don't conceive, their rations can be increased and low fertility will be perpetuated.

We have been selecting for growth rate in our Red Angus cows. I have been concerned about it so we force those heifers to breed at 12 to 14 months of age. If they don't conceive, they don't stay in the herd. The program has to be self-cleansing. We haven't assisted 5 cows with calving in the last 15 years

on our ranch. Not all of our calves are born alive, but I can tell my customers that we have not perpetuated calving difficulty. Can you?

Historically you and I have probably PROTECTED our cattle with brands. We are entering an era that is more sophisticated. There will be truly branded products, trademarks and copyrights. If you are in the seedstock industry, that is an area that you will have to know more of.

Seedstock producers have been judged by how extreme their cattle are. My customers judge me by how PREDICTABLE the offspring of my bulls are. A lineup of bulls nearly 2/3 of a mile long, representing five breeds, containing purebreds and hybreds, but all similar in appearance is uniformity and predictability.

At sometime in the future we will have to somehow determine what kind of system we fit into. We became SYSTEMIZED. We decided that we did not have the capital to get any larger, so we have cooperative, contractual arrangements with other producers. We believe we have the genetic ability and the marketing ability to compliment a producer who has the management, land and cattle resources. Why not join together? Chances are good that the man that sells shoes and owns the shoe business does not own the building his business is located in. The fact that he does not own all the resources that he is working with does not hurt his pride. Why should it hurt a cattleman's pride?

I have described the types of cattle we have today, but find no contradiction in coming back three years from now and telling you that we have changed our cattle in a certain way. I will change my cattle if they need to be adjusted for the environment or if the feeder, packer and consumer want something different. There is nothing wrong with being FLEXIBLE, or changing.

Most importantly, we have to be PROFITABLE. We have a need to have positive cash flow, which has been difficult in the past years. Our bankers know that the systems many of us were using did not work. If we fail to become profitable, we will lose and in fact are losing many of the young cattlemen in our industry.

IN CLOSING

I am concerned for my son and I think you should be concerned for your sons and daughters too. There is a problem in our country that I think the cow industry is not addressing. There are many beef producers and many consumers. We are spending some 20 million dollars to promote our product. But the single most important problem we have is that our profits have to go through a bottleneck created by the packers. We need to bargain with strength. We are all small independent producers in a perfectly competitive market. We are not independent because we are cowboys, we are independent because of the market structure that we are in.

The economic textbook 100 years ago predicted the way we act. If you make me a packer, where I'm only one of five in the country, then I'll act just like they do. We must get together and work together and support our cattle organizations. We need to keep our eyes on what the market is saying and quit fighting. There is nothing wrong with our competing in a capitalistic society, but when we get together in breed or cattle organizations we need to leave our competitive differences at home. I am concerned about our young people, but I am optimistic. I hope that when the dust settles and when you see the Leachman brand or the Leachman name, it will still be part of the beef industry.

DISCUSSION

QUESTION. I would like you to elaborate because I think you really made a big point about the fact that cattle that grade choice at the weights you're talking about make the kind of females that work. You hinted on the fact that lean beef can go too far. Say it again.

ANSWER. Well, I really do think lean beef can go to far if it gets to the point where the cattle will not work from the production or environment standpoint. The thing is that most often both factors are involved in raising or selling cattle that are used in an intensive management system. But I am not convinced at all that we are ever going to go to intensive management systems. Look at the great things about our Hereford cows. The Hereford cow had flesh on her back, she didn't milk too much and she re-bred. When we took the fat off her back and put some milk into her, we ruined the Hereford cow. Now I'm not saying she didn't need to move, or that our Angus cattle didn't, because they needed to. But I believe they didn't have to go so far.

QUESTION. What other five breeds are involved in your breeding program?

ANSWER. I hesitate in answering that because again I don't think the important thing to go home with from here are the breeds. We are working with the Red Angus, Simmental, Gelbveih, Salers and South Devon breeds. When a customer comes to us, and says what about "this breed", we say here are the good points and here are the weak points. There is no best breed. It depends on your limiting factor or your problem. The best breed for you is one that can overcome your limiting factor or correct your problem. We recommend the Angus or Salers to overcome calving problems. If someone comes in with puberty problems, we recommend the Angus or Gelbveih cattle. In our country, some crossbreeding programs have moved out so far the cattle won't grade. South Devon cattle rank with Angus, Jersey and Red Polled cattle in grading and have the highest tenderness score of any breed. So if someone is having a grading problem, we say put South Devon in. If someone is having a low amount of growth, we recommend the Simmental. No breed is perfect and I'm not saying that those are the only 5 breeds. I only need about three of them to maintain 86 or 87% heterosis, but some of my customers have different needs. Other breeds could likely be developed to fit the philosophy too.

QUESTION. How many years did it take you to develop the herd you have?

ANSWER. Fifteen.

QUESTION. Do you have the same problem in the States as we do with selling off-color or short-tailed calves? I noticed your cattle are all the same color. Is that a marketing factor that you didn't bring up because it is so obvious?

ANSWER. We got into the red baldy thing years ago because we had customers using Red Angus bulls on Hereford cows for 2 and 3 generations. Their cattle got too solid colored. The color of our cattle indicates they are crossbred. With 3/4 cross you can get too solid-colored.

We likely have the same problems in marketing. In our country, cattle can be 'too straight' whether they are Black or Red Angus. The main difference between Canada and the US is in the grading situation. I think I'm reasonably open-minded. But regardless of your grading system, I think you need the Angus type traits, the convenience type traits, and in Canada you get them as lean as you can. I don't know how you get by; I don't think you are getting by, actually, because I think you have gone out so far with some of your breeds that your cows must be headaches to manage.

QUESTION. I think our problem is that we are not far enough out. Our market wants more but we have generally stayed near the middle. The Americans buy our extremes in the purebred business.

ANSWER. That point is well taken. Providing your market isn't going to wow on you, by wanting a little too much size and leanness, your grading system may well be efficient. I don't know if the industry recognizes how big cattle are today. Basically the shows today place big-framed cattle. The 6-frames are standing dead last. My max for the industry looks bad at Denver or your Agribition. It looks small. All I am saying is that exhibit of 22 head is what I think is pushed far enough. I like to win, but if I have to make my cattle bigger to win, I won't show. We don't show our big breeds because we have been bringing them down.

QUESTION. Regarding the lean beef concept in Canada, the same thing is taking place in the US. The consumer is under the mis-impression that if you are going to eat any beef, the only beef you should eat is that with absolutely no fat on it whatsoever. Even though we as producers may know that's not the best beef we can produce, we still have this thing called the consumer. What may be functional and what may be saleable are not necessarily the same thing. We may be producing what we think are the most perfect cattle in the world. If the consumer doesn't buy that product, we are losing.

ANSWER. Your point is very well taken. I have to tell you that this is the most production-oriented meeting that I have been to in years. This same kind of function in our country is 100% marketing-oriented. There would be no one telling you to make them gain 6 pounds a day or that you have to breed 60 cows an hour or something. They would be talking about how to market these cattle. And I am a friend, but in this one area, I have a sense that you are behind us. How many in this room understand direct marketing? An American group would spend 90% of its time talking about how they are going to market direct or how they will find a way to have retained ownership someway through the system, not how they can make them more efficient, and how they can produce more and more. I think we all must become market-driven.

QUESTION. You're saying then that the consumer is going to want an edible cut of beef.

ANSWER. In the short run he is going to. The data definitely shows he wants lean beef. Not only does it say that, it says that the consumer wants 'really lean' beef. I think that will go its course. Under a branded product, whether it's for a huge supermarket or a packer or an individual consumer, the product has to work. If you sell a piece of meat that doesn't eat right, you have problems. And the specs on lean beef already state that they won't take any Holstein or eared cattle. Why? Because data show that they are tougher. Eared cattle are lean, but they won't touch them. They want a consistent product that will have the desired edibility. They won't take a Holstein because of the muscle:bone ratio. I was taught 10 years ago to forget about the bone because it was such a small part of the carcass composition. But there are cattle walking around today that have a lot of bone. And we have a problem. But I am optimistic, at least in our country, that the target is not only one that I can hit, but one that I can live with. I'm not sure I could say that here in Canada. But everything goes its course.

MANAGING CHANGE ON THE FARM

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TIMES CAN BE TOUGH

Raising cattle can be like trying to grow wheat in dry sand. It's possible but only with a lot of help.

We face problems like the cost price squeeze, with input costs constantly rising. We face lower incomes and higher debt. We know that interest rates may soon begin to rise again. Credit is hard to come by. Some of us are asset rich. All of us are cash poor.

AN UNCERTAIN FUTURE

We face an uncertain future with higher transport costs and decreasing land values. We watch the American farm crisis and see increasing foreign self-reliance.

We would like to expand in areas where we can make a dollar. Then we discover that growth costs cash. So we make more money and find ourselves deeper in debt.

The average selling price of a cow/calf was about $325 in 1974. This price dropped to less than $250 in 1977. From 1979 to 1985 it was remarkably steady at $450. So each year as input costs go up, we are under increasing pressure for change. It's a bit like the farmer who decided to commit suicide by lying on the railroad track, only to starve to death waiting for the next train.

OPPORTUNITIES FOR CHANGE

There are many opportunities for change. These include better production methods, scientific breeding and feeding and fall calving.

The best way to think about opportunities for change is to think of your operation as a manufacturing plant, as represented in Figure 1.

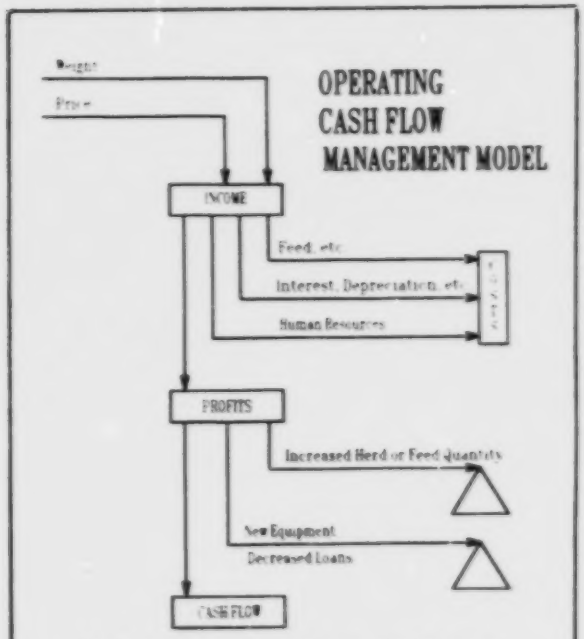

Figure 1. Cash Flow Model of Cattle Manufacturing Plant

This manufacturing plant of yours brings in dollars. These dollars depend upon what volume of product you produce and upon the price you get per pound for the quality you deliver. You can produce extra pounds of low quality product at the wrong time. Or you can produce the best quality when it's needed, but not enough of it.

To maximize the dollars generated by your plant, you must pay attention to volume, quality and timing. You need to ask a lot of 'what if' questions to find the right mix.

Unfortunately, much of the cash your manufacturing plant produces never reaches your pockets. To arrive at your profits, you must first pay for the feed and other supplies your sold cattle consumed. Then you have to pay interest on your unsold stock and other debts. You also have salary costs and professional and service fees.

Finally, before you make a real profit, you have to deduct depreciation, which is best thought of as money put aside to replace your aging and less valuable plant and equipment. Depreciation is a real cost even if you don't account for it, unless you plan to let everything run down before you simply abandon your farm.

PROFIT ISN'T CASH

Let's say you have a small profit at your plant. Profit isn't cash. Now you have to take your hard earned profit and pay back some of that money you borrowed. Also, you probably have bought more new buildings and equipment than covered by your depreciation. If you're getting larger, you may want to increase your inventory of cows or feed, or maybe the average age, and therefore cost, of your herd has increased.

So the amount of cash you have left over for yourselves is dependent upon all of these factors:

- volume
- quality
- selling price and timing
- feed costs and supplies
- interest
- professional and other services
- salaries
- aging facilities and machines
- debt repayments
- expanded plant or equipment
- growth of herd or feed inventories
- age of herd

Now we **really** have some 'what if' questions to answer. That's why it's the rich cattlemen who own computers.

But each of these factors can also represent an OPPORTUNITY, a challenge for change and profits.

WHAT DO WE WANT FROM FARMING

Rural life satisfies many important goals. It promises:

* Self-sufficiency and independence
* Pride of accomplishment
* Bonding with the land
* Husbands and wives share a common profession that closely links family and work
* Privacy, yet closeness to neighbours
* Responsibility to the past
* A legacy for the future

To achieve these goals, it's important to concentrate on spending time on accomplishment, rather than worrying about the past. It's important to seek new ways of doing old tasks better. Innovation is critical.

MANAGING CHANGE

The rules of the game keep changing, and each of us must change with them. But we often reject a new idea because it goes against our former knowledge. Even after we understand it and agree with it, it's still hard to accept. Eventually, though, new ideas become part of the mainstream of our future knowledge.

We have to keep up with new ideas whether we like it or not.

CHANGE IS STABILITY

Just like any other business, raising cattle starts with a broad PURPOSE. This purpose is an expression about what we want to accomplish to give us the life satisfactions we seek.

But with only a purpose or set of goals, nothing can happen until we mobilize our RESOURCES.

These resources include our markets or customers, our manpower, our machinery and equipment, our money or financial resources, our best methods, the right materials and feeds, a supportive physical, social, economic and political environment, necessary information, and time to make it all happen. We sometimes call these resources the nine M's, as shown in Figure 2.

Mobilizing our resources causes us to look back and modify our purpose and goals. This in turn may cause us to adjust our resources in terms of our new desires.

With only purpose and resources, nothing happens until we take ACTIONS, the day-to-day activities which really produce the product. These actions depend on the resources available, the purpose of the enterprise, and so on.

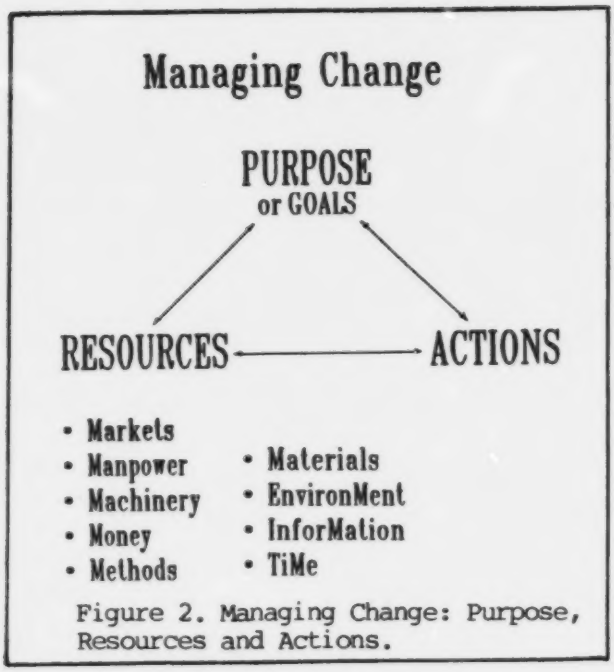

Figure 2. Managing Change: Purpose, Resources and Actions.

The three components, Purpose, Resources and Actions, must always be in balance if our enterprise is to be stable and successful. We must continually adjust and change. So CHANGE IS STABILITY. Lack of change, sticking with the tried and true, produces instability and failure.

CREATIVITY

The idea that change is stability leads us to the practice of creativity, since creativity is the process of making change.

Creativity begins with rumination. Rumination is quiet thought about a given situation and the ways it can be handled. It gives us an opportunity to think big, far out, and take a Creative Leap.

To take a Creative Leap, first place yourself firmly in the future, and visualize where you want to be in that future. Then use this target or image of the future as your guide to today's actions and decisions. In short, look back from the future, rather than forward from the past.

Don't think about next year's plans in terms of this year, but in terms of the year after that; the "Cow After Next" approach.

Being up to date isn't good enough. If you are only up to date, then tomorrow you will be behind the times. Knowing where you want to go is more important than knowing where you've been. Compare former US President Nixon's claim "I would have made a good Pope" with President Kennedy's vision "To put a man on the moon in this decade and bring him back safely".

So change is stability. Change requires creativity and the Creative Leap.

HOW TO GET WHAT YOU WANT

HOW TO MAKE HAY

Making hay is a simple proposition.

1. Prepare the land
2. Plant the seed
3. Pray for rain
4. Mow the hay
5. Sell

Making **personal** hay is just about the same.

1. Prepare yourself
2. Get motivated
3. Have faith
4. Take action
5. Profit and enjoy

Making personal hay uses the power of Targeted Thinking. Targeted Thinking means:

OPPORTUNITY
FUTURE VISION
RESPONSE

This of course is just the Creative Leap in a different coat.

(1) Know what you want to accomplish
(2) Go into the future and take a good look
(3) Make sure all your actions and decisions move that way

Think about it like this:

* Keeping Up to Future Date
* Looking Back From the Future
* Staying Ahead of Today's Changes

VISUALIZATION

The idea of looking back from the future seems at first like nonsense. But it means seeing the ultimate solution to today's concerns.

When you visualize the future, you should think about what you want to do, what you will gain, and exactly how it will be accomplished: How? Who? Where? When?

This visualization of the future will give you a target direction to follow. It gives you motivation, it provides a planning framework and action guidelines.

PAUL J. MEYER'S MILLION DOLLAR SALES PLAN

Paul Meyer, a sales and personal motivation expert, offers the following plan for success:

HAVE I ....

1. Crystallized my thinking in writing?
2. A plan/schedule for its attainment?
3. A burning desire to move forward?
4. Confidence in my ability to succeed?
5. An iron will to pay the price, no matter what the circumstances?

SECRETS OF SUCCESS

Here are the traits of successful young farmers. These traits apply equally to others in any business.

* Enthusiastic, by reading about the new ideas and the success of others.
* Confident, aggressive for challenge.
* Motivated self-starters.
* Take intelligent risks.
* Search for new and better ideas.
* Visit other farmers, researchers, extension representatives, attend farm meetings.
* Make time to think.
* Enjoy making decisions, solving problems and accepting responsibility.
* Oriented towards achievement, rather than security.

PERSONAL MOTIVATION

Finally, there is the critical issue of personal motivation.

Being motivated means working harder and more enthusiastically and positively towards your vision. To be motivated, you must commit yourself to success. You must have a definite purpose, and a plan for its achievement. You must work on your plans continually, spending at least 15 minutes each day reading and refining them.

You must develop the habit of going the extra mile. You must give yourself away; giving more than you receive. You must take that first irreversible step.

At the same time, you must know how to work with and inspire and motivate others. If your farm hands aren't as motivated as you, maybe it's because you've stolen all the rewards, rewards such as pride of accomplishment, a feeling of ownership, participation in your decisions and a vision of the future.

HOW DO WE GET TO THE FUTURE?

Getting to the future needs some simple tools, those we have discussed. They include being up to future date, knowing how to practice creativity, knowing how to manage your time through visualization, developing and maintaining a positive attitude, self-control to reduce stress, and constant learning to capture your vision.

Remember: **DON'T LOOK BACK UNLESS YOU WANT TO GO THAT WAY.**

FEEDING THE EFFICIENT COW FOR REPRODUCTION

Rick Corbett, Nutritionist
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INTRODUCTION

Feeding the efficient cow is a very broad topic. Textbooks have been written on the subject of nutrition. I will be discussing nutrition from a practical point of view, in terms of how nutrition and nutritionally related problems can be dealt with. The discussion will be limited to nutrition as it affects reproduction in cattle.

In the proceedings from the What's In Stock seminar last year, an article by Ed Duren listed four key indicators of the management level in a cow herd. The four measures were 1) number of open cows, 2) length of the calving season, 3) calf death losses and 4) growth in reference to weaning weight. Duren went on to identify key problems. He said nutrition was usually the first problem that came to mind and was without a doubt the most common problem in getting cows to breed.

My intention is to discuss nutrition in terms of getting cows to breed, in the context of working with what resources and levels of management we have, rather than through trying to change our management.

Deficiencies of protein, energy, phosphorus, and the trace elements selenium, copper, manganese, zinc and iodine are the most common nutrient deficiencies involved with reproductive problems. Protein, energy and phosphorus deficiencies occur most often, but the trace elements also have a role to play in reproduction. I have run into trace mineral deficiencies more and more often not because they are more of a problem now, but because they have become more easily recognized.

RECOGNIZING REPRODUCTIVE PROBLEMS

The kinds of reproductive problems I am familiar with are not easy to diagnose. Obvious problems are relatively easy to correct but a nutrient deficiency does not necessarily produce symptoms that are easily recognized. Most often nutrient deficiency problems must be detected through records.

I want you to imagine for a moment that you have cows that are calving today. I am going to suggest that you have a nutrient deficiency problem that will cause a reproductive problem in the herd. How long will it take for you to recognize that you have a problem? With a selenium deficiency, for example, when a calf is born that dies of white muscle disease, you can get that diagnosed. A dead calf is a pretty good indication of a problem. But without something like a dead calf or some other very obvious symptom, how long will it take to recognize the problem?

Assuming natural servicing instead of AI, I developed two different scenarios, depending on whether records are kept. It will be much easier for you to diagnose a problem if you have records. If the problem existed today, and records were kept, I think it would be optimistic to suggest that it would take you 9 months to recognize that you have that problem today. The reason for that will be because the cow is delayed in coming into heat after calving and therefore is late in becoming pregnant. So your first opportunity is going to be basically nine months from now. On the pessimistic side, you may not observe any problem until weaning time the next fall when your indicator will be a reduction in weaning weight. A reduction in weaning weight would have to be fairly large before you would recognize it. Then you would look back over the last nine months and try to determine why you got that reduction. There are all kinds of reasons why that could have occurred. Perhaps the grass didn't come as early as usual, or you didn't get rain when it was needed. Those kinds of reasons are quickly thought of. Being pessimistic it would take 21 months with records, providing you had a very large impact on weaning weight, which isn't the usual case.

Without records it will take you at least 21 months. The problem you would more likely have is not with the calf that was born today, but with the calf that the cow isn't even pregnant with yet. That cow must first become pregnant and have that calf and wean it, which requires about 21 months. Then the problem will likely be indicated through a reduction in weaning weight, just because the cow got pregnant later. You now have 21 months to review to try to figure out what happened to cause a reduction in weaning weight. More realistically, it will be never that you find out there was a reproductive problem if you don't have records.

PROTEIN

Researchers in Idaho were looking at a large problem they had with very weak calves at birth. They demonstrated that lack of protein in the diet of the cow increased the incidence of weak calf syndrome. If protein was fed to requirements, weak calf syndrome tended to disappear (Figure 1).

Protein deficiency is very difficult to diagnose. Cows most often do not show symptoms themselves unless protein deficiency is very severe, which is seldom. But protein deficiency can have a fairly large impact on the calf without showing any symptoms on the cows. Cows do not have to be thin before they are deficient in protein; fat cows can be protein deficient.

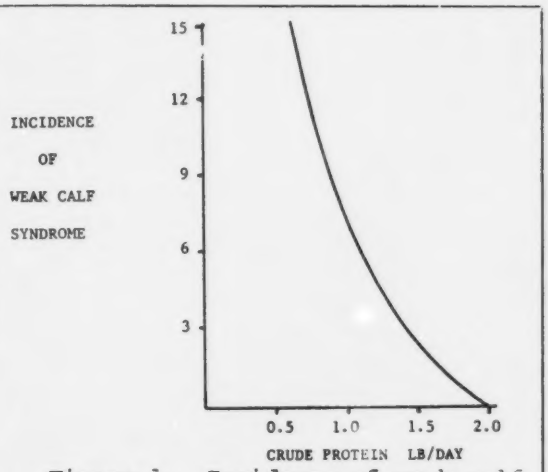

Figure 1. Incidence of weak calf syndrome in cattle herds consuming various amounts of crude protein.

Probably the best example I can give you is that of a particular fellow who asked me to formulate a ration for his calves. I tested his feed, which was low in protein. This fellow had to rely on commercial protein supplement. When I went to see him in the spring, I was informed that he had a problem. He had apparently done exactly what I told him but ended up with small, underweight but fat calves - butterballs. That disturbed me. At any rate, I found out he did everything I told him except he didn't include the protein supplement. He ended up with calves that gained very little weight, but were fat. Condition alone did not suggest any protein deficiency, but it existed.

Cows seldom show symptoms of protein deficiency themselves. You must determine the protein content in the feed. There is no other way of doing that other than by feed testing. If feeding grain, bushel weight is quite often purported to relate to protein content. Bushel weight has in fact no affect on protein content. Protein content of the major feed sources for cows cannot be determined by looking at or smelling the feed.

ENERGY

Energy is probably the most difficult thing to comprehend and is usually measured with accuracy only after the fact. In other words, you feed the animal, find out how it does and then decide what the energy content of the feed was. Predicting the energy content of feed is at the moment something close to witchcraft. I think probably a better way to talk about energy is in terms of the condition of the cows, or how much fat the animals carry.

A condition scoring system is a much better way of deciding the condition of a cow than is a description such as 'a bit thin' or 'good' or 'maybe a little too fat'. You have to admit that if we all went out today and looked at a group of cows, we would, if there are 100 people in this room, end up with 100 different opinions on the condition of that group of animals. One thing we can be sure of when we talk of the condition of cows is that we will disagree. But a condition score is a condition score. For example, a condition score of 3 means the same to you as it does to me, as opposed to what 'good' or 'poor' condition means to us.

Most condition scoring systems use the short ribs right in front of the hips, behind the full ribs and in front of the hook. The fat cover over those short ribs indicates the fatness on the animal. If you can't feel the short ribs with the end of your thumb, you have a fairly fat animal, which would score at least a 4. If you can feel the short ribs without difficulty, that would be a condition score of 2 or less. What is normally considered to be 'good' condition is a score of 3, in a range of 1 to 5.

The energy needs of a cow before calving were studied (Table 1). High energy and low energy (deficient) intake levels were compared. Because fetal growth is very rapid during the last 30

days before calving, the energy you feed the cow then has a direct affect on lbs of calf weaned per cow calves. When energy was underfed, lbs of calf weaned per cow calved was reduced. The number of calves born alive, calves alive at two weeks and calves alive at weaning were reduced when the cows were given inadequate amounts of energy. The calves were weak and not capable of fighting disease. As energy intake was increased prior to calving, birth weight increased.

Table 1. Calf performance and survival as influenced by dam's energy intake 30 days before calving *.

	Dam's Energy Intake	
	High	Low
Birth weight (lb)	66.8	58.7
Weaning weight (lb)	320	294
Calves born alive(%)	100	90
Calves alive at two weeks (%)	100	81
Calves alive at weaning (%)	100	71

*Thomas G. Dunn, 1975

One might interpret this information to mean that if you fed more energy you would increase birth weight. I think that is an incorrect interpretation. I think we haven't increased the birth weight of that calf. Really what we have done by underfeeding energy is reduced the birth weight and paid a heavy penalty as a consequence.

Another trial looked at how much energy it would take prior to calving to increase calving difficulty in heifers (Table 2). The incidence of dystocia or calving difficulty was 71% when energy was underfed and 66% when energy was overfed. Energy intake of the cows had little if any influence on birth weights.

Table 2. Effects of gestation feed level on dystocia and reproduction in heifers *.

	Gestation Energy Level	
	Low (7-8 lb TDN)	High (13.8-15 lb TDN)
Post calf body wt lbs	694	794
Calf birth wt lbs	68	71
Dystocia %	71	68
Pregnancy rate %	65	83

* Bellows, R.A., 1979.

Basically all the research that has been done on the effect of energy intake on birth weights and calving difficulty says that you may be able to reduce birth weight by underfeeding energy, but calving difficulty will not be affected. This does not mean that birth weight of the calf has no impact on calving difficulty. There is no question about that. But birth weight of the calf does not appear to be influenced by nutrition. If the calf is going to be big and the heifer is going to have difficulty giving birth it is not because of nutrition. It is a genetic problem, which cannot be solved with nutrition. We cannot help calving ease by underfeeding to reduce birth weight.

When we are talking about calving difficulty, we should probably be looking at the condition of the heifer rather than at the feeding program. There is a relationship between cow condition and calving difficulty. The fatter a cow gets, the more dystocia will likely occur (Table 3). When you get a condition score between 2 1/2 and 3 on a scale of 1 to 5, you appear to have reached the best condition in terms of reproduction. As the condition of the animal goes up , pregnancy rate goes

up but we should probably be calving cows at condition scores of 2 1/2 to 3. At those scores, heifers won't be so fat that calving will be difficult.

Table 3. Relationship between calving difficulty and condition score in heifers *.

Condition Score	% Calving Difficulty (Average)
1	23.8
2	18.9
3	16.0
4	19.8
5	29.5

* Philipson J., 1976 as quoted from R. Hand, 1986

Condition is determined mostly by energy intake. Condition indicates energy intake and energy status of the animal over a long period of time. To move from a 2 to a 3 in a typical 1200 lb beef cow, bodyweight likely changes by 100 to 150 lb.

PHOSPHORUS

Studies (Table 4) indicated that percent calf crop weaned increased and days between calving decreased with phosphorus supplementation. The reason for these changes is that more cows got pregnant in the first place and they got pregnant sooner after calving.

That is basically the story of phosphorus deficiency and the kinds of things that can happen. Phosphorus deficiencies usually relate to cows coming into heat and hence getting pregnant, and thus affect weaning and conception rates and numbers of open cows.

Table 4. Effect of phosphorus on calf crop *.

	No Phosphorus	Bone Meal
% calf crop weaned	64	88
Days between calvings	459	365

* Wiltband, 1970

Average phosphorus content of forages grown in Saskatchewan (Table 5) indicate that they are at best borderline in providing the phosphorus requirements of a dry cow. Cereal hays may be an exception. Phosphorus requirements for lactation are quite high, in which case even cereal forages tend to be low in phosphorous content. Grains are good sources of phosphorus but most people don't feed a lot of grain. More importantly the range in phosphorus content of feedstuffs is very wide. Supplements are often needed.

Table 5. Phosphorus content of Saskatchewan feeds *.

	Average	Range
Alfalfa Hay	0.2	0.12-0.37
Brome Hay	0.18	0.1-0.2
Cereal Hay	0.24	0.07-0.4
Barley Grain	0.33	0.18-0.49

* Christensen et al., 1978

Cow requirement: dry 0.21
lactating 0.22-0.33

Averages are interesting. They don't mean anything. The way I like to think of averages is if you take two buckets of water, one with ice cubes floating and the other near-boiling hot, and if you stick a hand in each, probably on average, your hands would be warm.

It can be concluded that phosphorus is probably one thing that you better pay attention to and supplement when necessary. There is also no way of telling how much phosphorus there is in a particular feed without testing it.

TRACE ELEMENTS

There are six trace elements that play a major role in reproduction. Cobalt and iodine are commonly supplemented by feeding blue salt. Zinc, copper, selenium and manganese are the other four. People have a difficult time in relating to trace element requirements of parts per million. Just to give you an idea, one ounce of selenium is a 38 year supply for a beef cow. One ounce of copper is a 280 day supply for one beef cow.

Table 6. Percent of feeds grown in Saskatchewan containing less than the required amount of trace mineral *.

	Copper 10 ppm	Zinc 40 ppm	Manganese 40 ppm
Alfalfa hay	63	97	55
Alfalfa brome	42	100	32
Cereal hay	19	87	35
Barley grain	100	88	100
Oat grain	100	93	38

* Christensen, Ford and Mitchell, 1978.

The minimum requirement of copper is 10 ppm. Requirements can increase if a water sulfate problem exists. A large percentage of forages grown in Saskatchewan do not contain enough copper (Table 6). All grains are deficient. With a requirement of 40 ppm, which I think should be 50 ppm, 87 to 100% of the feeds grown in Saskatchewan don't have enough zinc in them. Most feeds don't contain enough manganese at 40 ppm, which I think is also too low. Chances of being deficient in one or more of these trace elements are very good.

Reproductive problems associated with a deficiency of one or more of the trace elements are numerous and varied. They are also very often hard to detect. Early embryonic death, for example, means the fetus dies in the first week or so after conception. We generally see no symptoms. If using bulls in natural service, we didn't know the cows were bred in the first place when they come into heat again. So these problems sound neat but are difficult to detect. Most of the problems occurring are in my opinion not recognized at all.

We conducted a feeding trial to determine the value of trace-mineralized salt. A herd of cows was divided into two groups. One group was fed regular salt, the other trace-mineralized salt. Weaning weight increased by 12 pounds when trace-mineralized salt was fed. In another trial, weaning weight was increased by 20 lbs when trace-mineralized salt was fed. The extra cost of supplementing with trace elements is currently about 90 cents per cow maximum. A 12 lb increase in weaning weight can easily pay for that. The increase in weaning weight occurred just because the cows got pregnant earlier in the breeding season and calved earlier. If trace minerals were fed to calves on pasture, weaning weight would likely increase even more firstly through the effect of trace mineral supplementation on reproduction and secondly through its direct effect on the growth rate of the calves. Trace mineral supplementation does not cost a lot of money.

EFFICIENT MARKET PLANNING IN 1987

David Christopherson
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INTRODUCTION

Certain market issues can affect your production or planning decisions. Such issues include factors that affect feeder prices in the province, consumer demand for beef, the impact of international trade in beef and what effect changes in the international market will have on you. These issues should be included in strategic planning.

There is a very strong relationship between the price of feeders in Saskatchewan and the price of corn in the United States. This link is much stronger than the link between the price of barley here and the price of feeder cattle here. There is a reason for that. There is a distinction in the consumer demand for high quality and low quality beef. There is a real difference in the nature of the demand for these types of beef, which has some impact on how the beef market moves around and has some implications for you when you are looking at what is happening in the market. I want to discuss how closely interlinked the North American and Oceanic markets are, and how EEC export has had a significant impact on North American prices, which we have responded to.

RELATIONSHIP BETWEEN FEEDER PRICES AND FEED PRICES

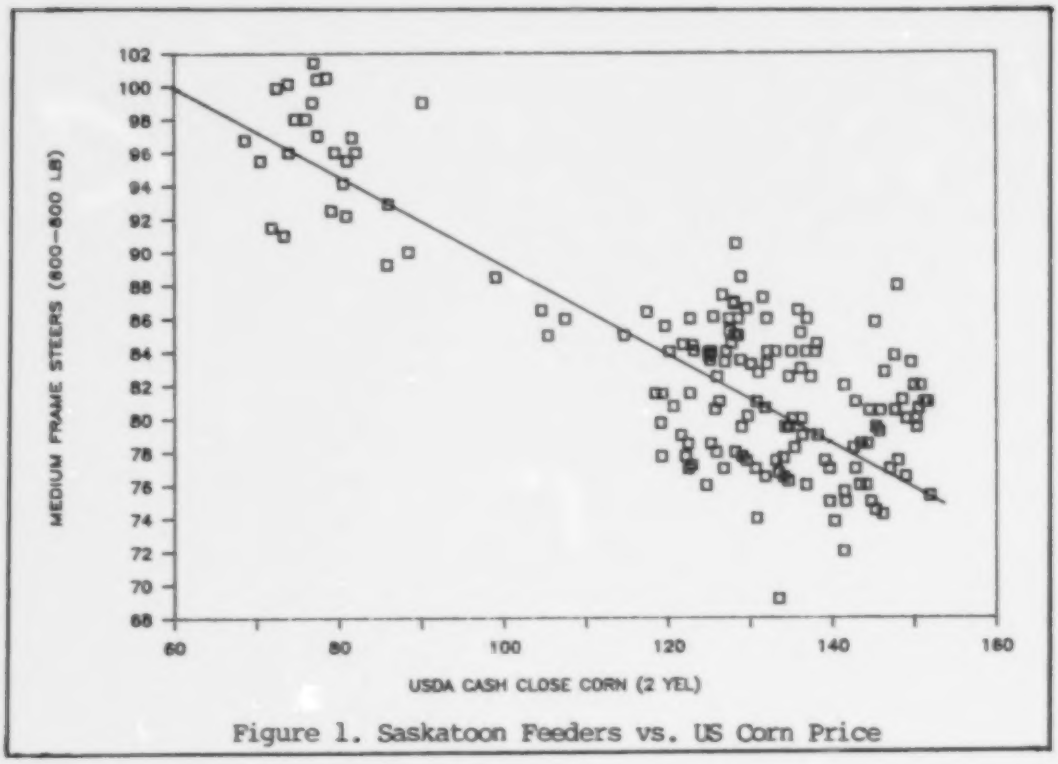


Figure 1. Saskatoon Feeders vs. US Corn Price

The price relationship between US corn and feeders in Saskatchewan is shown in figure 1. As the price of corn goes up, the price of steers goes down. This is a nice tight relationship that explains around 70% of the variation in feeder cattle prices. We would expect to find this kind of relationship because feeders move freely back and forth across the border. When the price of corn goes down in the US, Americans are more at liberty to be able to bid aggressively for our feeder cattle.

Figure 2 shows the relationship between the price of barley and the price of feeders in Saskatchewan. The relationship is not as tight as that between feeders and corn prices. If you compare the slopes on the two trend lines, they are virtually identical. But the price relationship between barley and feeders explains about 50 to 55% of the variability in cattle prices compared to 70% explained by the relationship between corn and feeders. This variability is due in part to institutional differences between the corn market in the US and the barley market in Canada, and institutional barriers that prevent the price of barley tracking the price of corn as closely as it should. For example, in late 1984 and early 1985, corn prices dropped very significantly in anticipation of the impact of the 85 US Farm Bill. The western Canadian barley market was insulated from this price change. The resulting price spread between corn and barley led to a very substantial upsurge in feeder export from Saskatchewan into the US.

What does this mean to you as producers? One thing you must bear in mind is that a dramatic change in corn prices can lead to feeder prices that are significantly out of whack with

local barley prices. This will occur in the market periodically. Once in a while when you find feeder prices that don't seem to be related to the cost of barley in Saskatchewan, take a look at what is happening south of the line. If this is the case, you have to ask yourself if the local barley prices are going to move back into the normal relationship with the price of corn. As a buyer you must try to decide when this will have an impact on your production. As a seller, if you think the price relationship is going to move back, you may want to consider moving a few more animals than you would otherwise, within the constraints of how fast you can move animals.

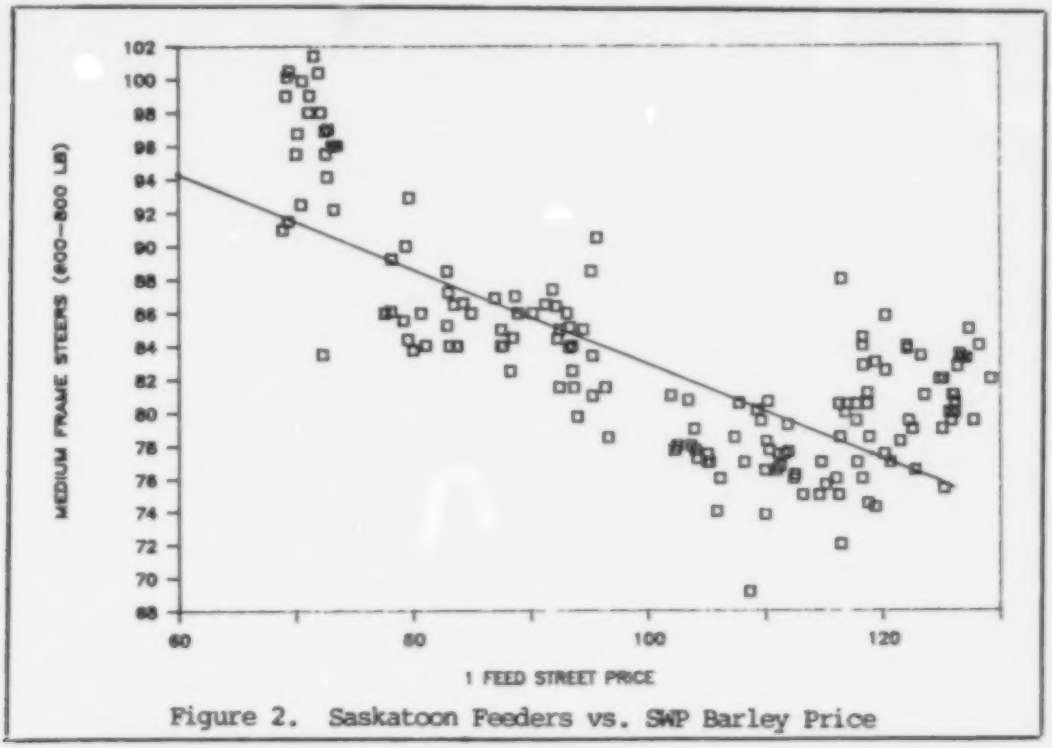


Figure 2. Saskatoon Feeders vs. SWP Barley Price

RELATIONSHIP BETWEEN FEEDER PRICES AND FINISHED CATTLE PRICES

As railgrade prices go up, the price of feeder steers goes up. But the relationship is weak; the data points are widely scattered around the estimated trend line (Figure 3). This relationship explains somewhere in the neighbourhood of 10% of the variability in the cattle market. The price of feeders is related to the expected selling price of finished beef. Today's price of fat beef is probably about the best prediction of the future price that exists. If you or I or anyone in the market has reason to anticipate a significant change in the market three months from now or 6 weeks from now, we can act on it. If a significant change in the market is anticipated and incorporated into today's decisions, people say okay, if I buy today and sell tomorrow I can make money, and they do it. This ability to incorporate these changes is subject to the market player's ability to meet the appropriate handling and storage costs. The bottom line is that today's fat prices probably predict future prices as well as anything.

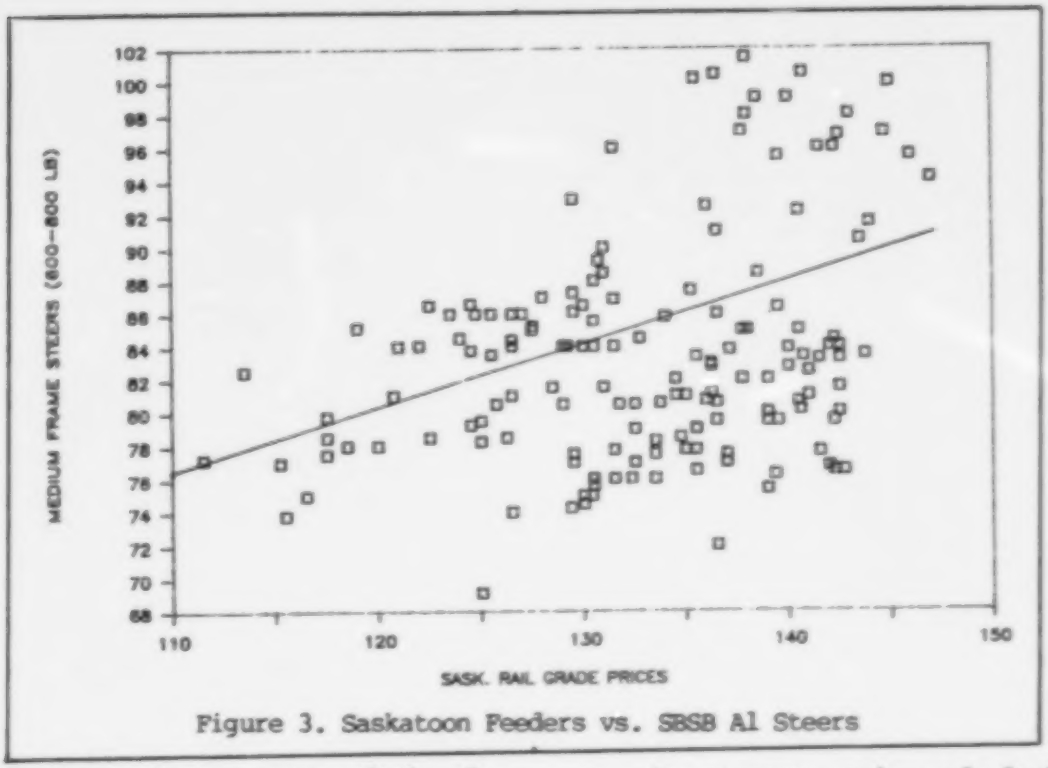


Figure 3. Saskatoon Feeders vs. SBSB A1 Steers

But there is a great deal of variability. The relationship between feeder cattle and finished cattle prices is not very strong. That is expected because no one is really confident about what will happen in the market.

If you try to priorize which factors will have an important impact, the factor that has the strongest impact or the most probability of having the strongest impact is the price of feed.

In summary, price of feeders is most closely related to the price of corn. The price of barley does not always track the price of corn, which can lead to a discrepancy in the relationship between the price of barley and the price of feeders in Saskatchewan. The price of fat cattle has less influence on the price of feeders than does the price of feed. Those are 3 things you have to think about when you are trying to make market decisions, whether you are in a selling or buying situation.

CONSUMER DEMAND FOR BEEF PRODUCTS

Going further along the market chain, we can examine some factors that affect the final demand for beef and the impact of the market demand for beef. All cattle are not the same and certainly all beef hanging on the rail is not the same. There are a multitude of beef products derived from the carcass. These products fill certain demands in the market place. This multitude can be broken down arbitrarily into two major components, high quality beef and low quality beef. This division into 2 sectors is based on the degree of further processing required and on the relative substitutability of the product. It is much easier to substitute rib steak for T-bone than it

is to substitute a rib steak for a piece of sausage. In addition to the difference in product quality there is a difference in the nature of the consumption of beef and there has been a lot of change in amount of beef eaten. Through the 1970's there was a significant upsurge in food eaten away from home (Figure 4). About 26% of disposable income was spent on food eaten away from home. The proportion of total income spent on food has been declining continuously for the last 2 decades. The upsurge in the amount of food eaten away from home appears to have levelled out since about 1980.

Approximately 20% of all meat consumed is eaten away from home. Beef has the highest share of this, about 53%. As a share of total beef consumption, 18% of total beef consumption is eaten away from home. When we look at the breakdown in consumption by the types of beef, we find that the demand for high quality beef has the largest portion of the market, beef which is derived from young, well finished steers and heifers, rib steaks and t-bones, etc. Low quality beef is derived from cows, bulls, and poorer cuts from steers and heifers.

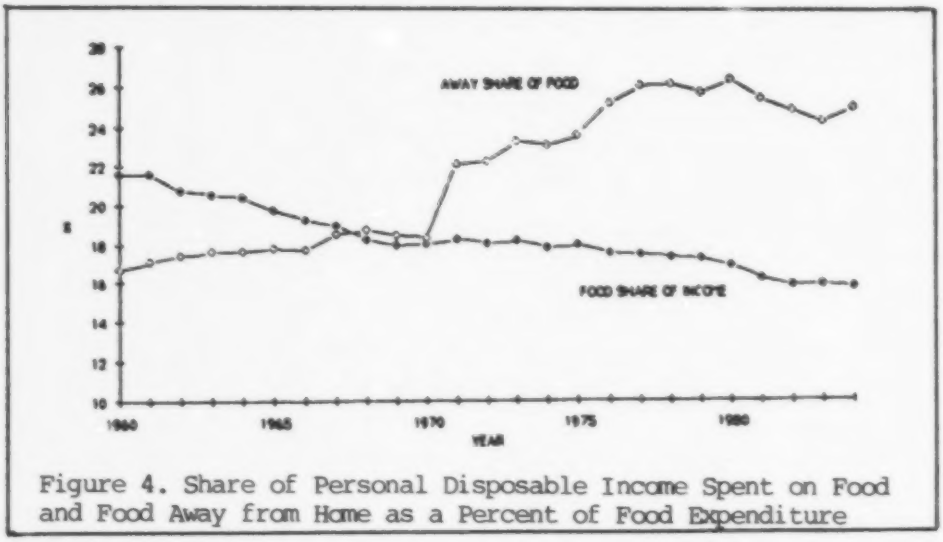


Figure 4. Share of Personal Disposable Income Spent on Food and Food Away from Home as a Percent of Food Expenditure

What is important is that the demand for these different qualities of beef is significantly different. The demand for high quality beef is very responsive to changes in the price. For example from 1967 through to 1985, a 1% increase in the price of high quality beef resulted in a 3/4% decrease in the consumption of high quality beef. That was a strong relationship. In the case of low quality beef, the consumer response to change in its price was not as strong. A 1% increase in the price of low quality beef resulted in less than 1/2% decrease in its consumption. This means that it is difficult for beef prices to really sky-rocket, due to strong consumer response to price change. What about the relationship of beef to other meats? Over the same time period we find virtually no increase in consumption of high quality beef in response to increases in pork prices. If the price of pork goes up, people don't switch over to high quality beef. However, consumption of low quality beef is very responsive to changes in the price of pork. A 1% increase in the price of pork resulted in a 1/3% increase in the consumption of low quality beef. Low quality beef is used in sausages, wieners and further processed products. Processors are

pretty indifferent as to whether they are using beef or pork, or often chicken. They are quite quick to move back and forth between the products as far as how much beef or how much pork is thrown into a sausage. Consumption of high quality beef is very responsive to changes in its price. Beef is used as a price leader in the meat trade, making it very difficult for beef to compete. Further, there is not a really strong relationship between the price of pork and high quality beef. For example, in the summer of 1986 when pork prices really took off, you didn't see a sky-rocket in high quality beef consumption. There was a strengthening in the beef market but it was related to the demand for poorer cuts. When you consider what happens in the market when competing meat prices change, remember it does not affect high quality cuts, only low quality beef.

IMPACT OF THE INTERNATIONAL MARKET

What are the international implications of one of these demands for one particular beef product, low quality beef? Low quality beef is imported from off-shore when the landed price is competitive with the price of Canadian low quality beef. Oceanic low quality beef normally draws a premium over Canadian low quality beef because of greater uniformity in the product. The fat content of Oceanic beef is normally more consistent than that of Canadian low quality beef. Further, Oceanic low quality beef generally has lower bacterial counts than Canadian low quality beef. When the price premium for landed Oceanic beef drops below about 5 cents a pound, we can expect to see significant increases in the import of Oceanic beef (Figure 5). Irish low quality beef has normally been discounted from Canadian low quality beef. It is usually more variable in fat content.

Figure 6 shows a gradual 10 year decline in imports of Oceanic beef. For a couple of years, part of that decline was spurred on by the imports of EEC beef. We are all well aware that these imports were the cause of considerable controversy and finally led to a countervail against beef from the EEC. Figure 7 shows production versus disappearance of low quality beef in Canada. In 1975 we were in a significant deficit position. We were consuming about 3 lb per capita more than we were producing. This in part explains the attraction of Oceanic beef and the high level of imports. There has been a continual growth or expansion in the supply of low quality beef produced in Canada, combined with a fairly static consumption level.

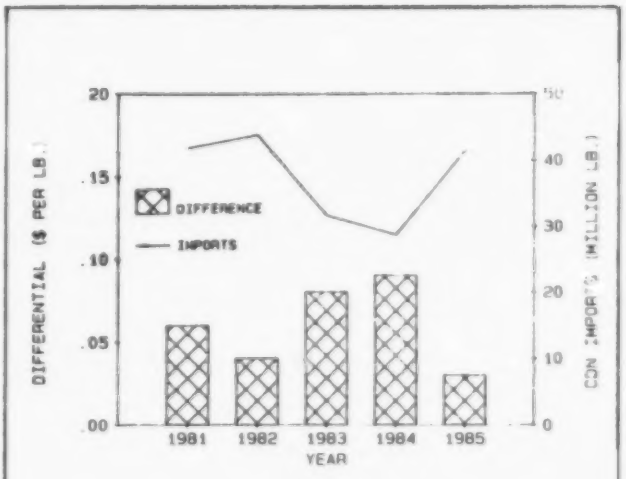


Figure 5. Canadian and Australian Beef Price Differential and Canadian Imports from Australia

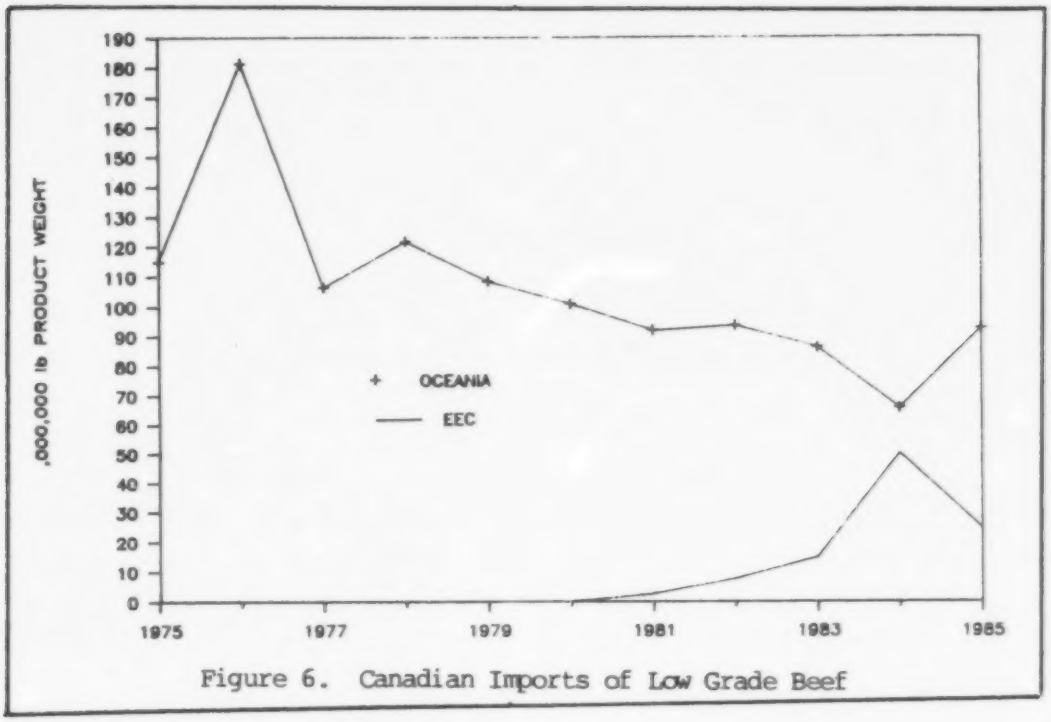


Figure 6. Canadian Imports of Low Grade Beef

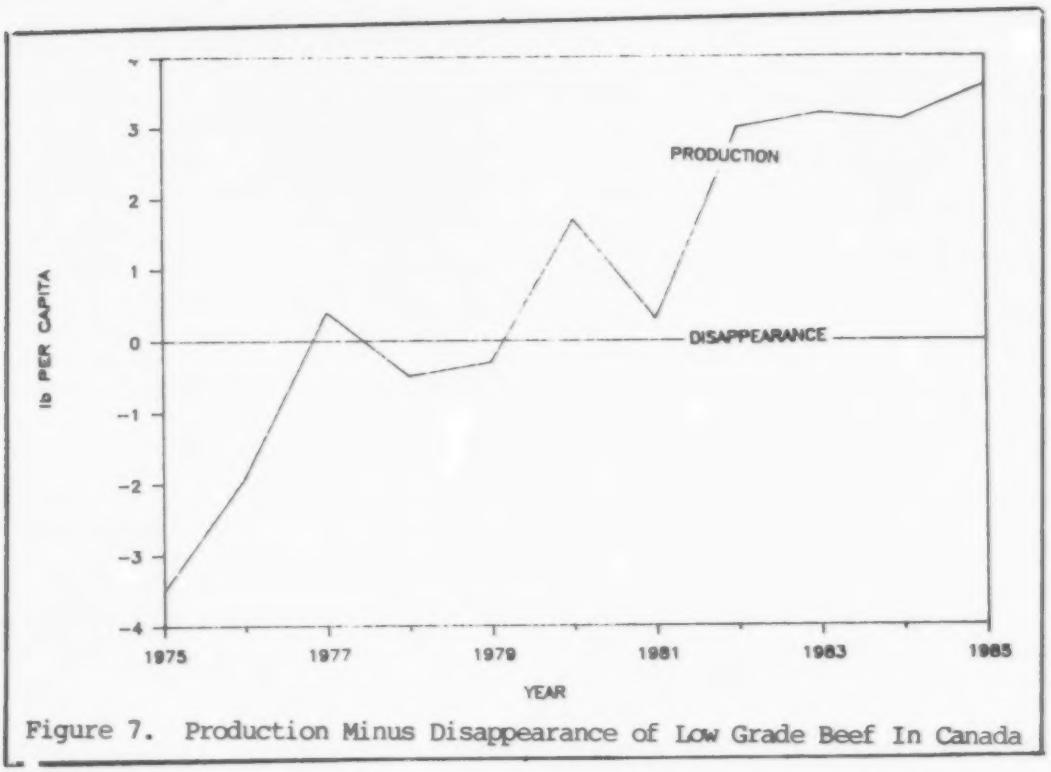


Figure 7. Production Minus Disappearance of Low Grade Beef In Canada

We are now in a surplus position in our supply of low quality beef. This surplus does not include the export of livestock from the US. It is product that has been produced in Canada. Canada has traditionally maintained free access with the American market. This has allowed us to remove excess production. We have also moved excess low quality beef into the US to the extent that we have imported off-shore beef. There was a price premium for Oceanic beef just because of a better product quality. Associated with that premium is our own domestic supply of low quality beef which we usually move into the US. It is obvious that we pretty well have to hang onto that American market as an outlet to market our low quality beef.

The other thing to remember is that even if we shut out the Oceanic beef, we would still be in a surplus position and would still need the American market. So we are pretty dependent and quite tightly tied to our customers south of the border. Only Canada, Australia and New Zealand have unrestricted access to the US beef market. It is obvious that we must maintain that access. Consequently any interference with our access to the American market would have serious repercussions, even if we were to consider limiting imports of Oceanic beef.

IN CLOSING

There is a link between the price of feeders in Saskatchewan and the price of corn in US which is stronger than that between feeders and barley in our province. Consumer demand for beef, which is distinguished between high and low quality beef has an impact on the nature of shifts in the market demand for beef. Finally, there is the impact of the international market. The North American and Oceanic markets are closely linked and will likely remain that way. Access to the US market is important.

DISCUSSION

QUESTION. You spoke of barley and cattle prices not being very closely related due to some institutional reasons. Did you mean Wheat Board involvement?

ANSWER. That is essentially what the situation is. Barley prices tend to track the price of corn. In a situation where a flat or fixed initial price exists over a 12 month period, and there is a significant change in the world market during that time period, there is a 4 or 5 month lag built into the response in Canada. You won't see a response in barley price until there is a change in the initial price. So there are institutional problems. Not to say that western Canadian cattle feeders never pick up any advantages associated with the Canadian system. But it hasn't occurred often in the recent past. Certainly many of you will remember the late 60's and early 70's when it was very difficult to move feed grain and its price was very low. There was certainly some increased profitability associated with livestock that was partly due to the nature of our institutions.

QUESTION. Will free trade have a positive or negative effect on beef prices?

ANSWER. Given how important the American market is to beef or pork and virtually the whole livestock complex, I think the best way to answer that is to say that if we lose access to the American market it will have a devastating impact on prices.

QUESTION. Will corn tariffs have any effect on the price relationship between corn and feeder cattle?

ANSWER. I would think absolutely none.

COUNTRY NATURAL BEEF: A PEOPLE PROJECT

P.H. (Doc) and Connie Hatfield
Hatfield's High Desert Ranch
Brothers, Oregon

(DOC) The point of this talk is not that we have the world by the tail. It is more of a people story and more of a concept than it is a set of directions on how to market your beef cattle. That is what we want to have you think about. I do believe Jim Leachman made some points in yesterday's talk that likely apply here, because of the Canadian government's involvement in beef, something which we don't have in the US at all. In grain we have some government involvement but in beef we have none. Our beef people are probably more market-oriented than they are production-oriented.

What Connie is going to start out with and what we're going to say may almost sound like a personal story but I think if you hang with us it will come together.

(CONNIE) One year ago today almost is when this started happening. My personal concerns existed for a year or two before that. I was so frustrated that we were not always getting what we needed for our cattle. It was ridiculous. We worked so hard to produce and never got anywhere. All this was going around in my mind. To make this story start out, I went and had a doctor's examination and found out that I had high cholesterol. I thought that it was older, fat people, mainly men who had cholesterol problems and I was quite surprised. The doctor said I should work on that. I also was getting somewhat of a middle-aged spread. I thought I had better learn a little about nutrition.

This is a bit embarrassing. I feel like I am telling my own personal life experiences. At any rate, I went to see a nutritionist, went on a diet and in 6 weeks time I was able to lose the extra weight. But the thing that was so neat about it was that is was a program designed to teach you how you should eat nutrition-wise. I knew the basic fours, I learned them back in 4H. But I really started learning nutrition and I found out that there is fat in so many foods. The thing that was so interesting is that the experts would say to be very careful with red meats. Of course, I had been hearing this. I had been hearing doctors say don't eat red meat. This really bothered me. I am a person that, for example, would have had to stop growing tobacco if I were a tobacco grower, because I really believe smoking is detrimental to the health. So I thought, is beef detrimental to our health? We are really into grass management and I thought why put this grass here and this animal that converts the grass to protein if it is not good. I didn't understand why we weren't supposed to eat red meat. Nutritionists said everything in moderation. I asked a fitness expert for his opinion of red meat. He said that he recommended it at least three times a week to his people who were into fitness, jogging and so on, but said they were having the hardest time getting the meat they wanted to buy. They wanted Argentina beef because it had no hormones and no antibiotics and was not fed in feedlots, but off grass. While driving home 60 miles I thought that we were raising exactly what he was asking for, 60 miles away. We just weren't marketing our product at all.

I don't believe in hormones myself, for several reasons. But this really got me thinking. We ranchers had to do something. We constantly hear on news broadcasts how the poor farmers are going out of business, and how sad it is. Well, how sad is it for us farmers?

One marketing expert we have talked to since we started into Country Natural Beef couldn't understand what we were doing before. He said when you produce a product, you add a fair profit for yourselves, you put a delivery cost on it, add an advertising cost, find out the retailers profit and then determine the last thing, whether the consumer will eat what you have produced. If they don't, if you go through that chain and they don't, you stop producing it. That made a lot of sense to me and I thought, where have I been as a rancher for all these years. So with this background, this is where we really started getting into what Country Natural Beef is.

(DOC) We are into grass and cows and desert and are fairly comfortable at that. We're used to blowing whistles and walking cows from one pasture to the next and it is because they are trained to the whistle, not because they are starving. We are into functional cows. It doesn't matter what breed they are, as long as they have the traits we need and can perform in our environment and do it on their own. We are really into grass management. We have some bottom land that because of the fire and grazing management on it, is reverting from sagebrush to meadow. We are really excited about those things. But somehow after what Connie got us into, and I'll have to say that I was dragged into it very negatively along with a lot of other people - it was her concept and not mine at all, we have to look beyond this cow and the grass and the sun and all those things and go on through the phases that occur in red meat production so we can get it out to where someone can use it.

We needed to start with the consumer. The consumer is what our basis is now. We are looking at the consumer and everything we do is backed up from there. If you look at it from that standpoint, then things like imports and exports and tariffs and futures are just sort of something in

between that doesn't have much bearing on what the consumer will pay for the product compared to what it costs to get it to that point. That will work in the meat department if you can get it through. The problem is to get our thinking changed to where we relate a cut of beef to a live beef animal. Generally in agriculture we were thinking that our market was whoever bought our cattle, be it feedlot or packer. But those were all just little people who worked for a fee. We had a high-level meeting at our ranch and discussed our marketing concerns. We sell some bulls and were discussing whether we would merchandize our bulls this year. Connie had this concept and said there was absolutely no point in even worrying about bull sales. We had 3 customers that went out of business in the last year. We had to do something about this beef marketing thing. There was no sense in worrying about seedstock if there was no market for our red meat.

From that discussion, Connie got about 35 people together. That was the first time I have ever been in a meeting where ranch men and women sat in the same group and talked about a common problem all afternoon.

(CONNIE) When we came in, I gave us all a name tag because some of us didn't know each other. I always like to put where you're from and what you do on your name tag. I asked one little lady, who was about 5 feet tall and whose name was Gracie, if she was a rancher. She looked at me with a puzzled expression and said " By golly, you're right, I am a rancher. You write rancher right down on that." That was the turn of the whole thing. In the past it was usually the women who went to the kitchen and the men who went out to take care of our industry. This way, we broke through that tradition. Both the men and the women worked together with their various expertise.

(DOC) At this meeting we decided that the government wasn't going to help us, we weren't suddenly going to have rising beef demand, and we were faced with a totally different economy. For sure, we were committed that change was coming and we had a lot of discussion. At the end, Connie was appointed as the delegate with the responsibility of going to Portland to sell our beef. It was real big of all us men in the group because we knew that she would crash up there. We weren't too interested in doing that. We understood things and she didn't. Her story when she went was:

> I represent a group of ranchers throughout Oregon. We own 10,000 mother cows. How best could we prepare the offspring of those cattle to serve your needs?

That was the major difference. That was marketing. Marketing is determining a need and then producing a product to fill that need. In the past we produced something and then tried to peddle it to someone. In the past we had been sellers, but never marketers. So Connie's question was how can we prepare these cattle so they can best fit your needs. We didn't tell them we were going to raise them, we asked them what they wanted. We said give us your specifications. If you want hormones, you can have them. If you don't want hormones, we can do that. We can raise them to 1400 pounds or can sell them to you at 600 lbs. How do you want them? Connie did get appointments with all the major retailer grocer chains in Oregon and she got in with the head meat-buyers and they all listened to her. Her final stop was at Ollie Welch's, which was a meat company that kills 150 head/day.

(CONNIE) I had an appointment with Larry Kline, the meat buyer. When I arrived I could hear him say, "Oh, gosh. Okay, I'll give her five minutes." I thought, I have to make this work in 5 minutes. Forty-five minutes later, I left there.

(DOC) Welch is an innovative kind of person. He stayed alive in the small packing house business when everyone else went belly up by really being innovative. His meat buyer, Larry Kline, was working with a marketing group and wholesaler and thought this was a pretty keen idea. He was the one that got us involved with the marketing people Connie spoke of earlier who said you produce it, you put a fair profit on, you put distribution costs on, you put advertising costs on, and if it doesn't sell, you don't grow it. Just that simple. And that is the way the rest of the world operates, except for agriculture. We seem to think that because we are producing things from the land that the world owes us a market. I suspect that those times have stopped.

Following Larry's meeting, we got pretty well acquainted from one end of the packing house to the other. We got acquainted with how a packing house operates and with USDA inspectors. We looked at cattle on the rail and we looked at carcasses and we decided what we wanted. What we came up with was an animal that was short-fed, basically grassed. Our basic product is a grass-fat 800 lb animal with 45 days of feed. In our grading system they grade low to mid-good which I assume is where your Al is - three tenths of an inch of fat on a smaller carcass. These folks thought we needed naturally-grown, smaller portions of a leaner product, yet tender and tasty which we can guarantee by only taking the ones out of the feedlot that are gaining rapidly.

Most of you may or may not be familiar with how a boning room works. The cattle come in on the rail, are sawed in half, and the pieces go onto a conveyor belt where a line of people cut the meat. The meat then goes into big tubs. This is the point where you lose identity of the cattle. And this is the point where, for example, the difference between a Limousin and Simmental show up. Both might have the same yield on the rail, but the Limousin has lots more red meat, certainly in comparison to its bone. And of course, Limousin people don't even get paid for that very well because you only measure that in the box and it's hard to measure on the rail. The meat goes from the tub into a big plastic bag and into a box. And that is what boxed beef is.

Somehow we have to keep our thinking between that box and our desert pretty well coordinated. That is an important difference.

After Connie went and got this packer and wholesaler interested, we men got pretty interested too. We gathered together 87 people and met in our barn. We had our accountant and attorney present, a banker or two, a meat packer, and a few other people who have a perspective other than ranching. We broke into groups and discussed various aspects of how we could form this marketing group. The first thing we did was come up with a goal. Our goal is:

> To provide a sustainable means through a group to profitably market quality beef products desired by the consumer while retaining every bit of independence.

That means that we are all individual, and that the cattle are financed by the individual all the way. We didn't want to have a normal, traditional co-op, although we are an incorporated co-operative. But the final segment that explains it is:

> Country Natural Beef is an idea that needs to be constantly examined, not an entity that can be bought or sold.

Then it was back to the packing house. The marketing people who were going to help us to sell this product weren't as committed as we and didn't get much done. So Connie and I sold the first two meat retailers. One retailer

actually went out to the feedlot with us to select the first animals to go, just as an interested bystander. One of our members is a major order-buyer for the eastern part of Oregon. He has three sets of triples and a set of doubles that go to Portland every week with a load of hogs. He was to put our test cattle on with the hogs to deliver them. We finally got our first sale ready and you guessed it. That was the one week his trucks didn't run into Portland. So Connie ended up hauling the first three head of cattle herself. Eventually they did get in the box and they did get into the retail store. It was really exciting to go to the store and open a box of boxed beef and know what steps those animals had made.

Then we decided to really get serious. After we had the beef at the counter, we gathered the group together. This is probably the key to why our group will work and whether we sell short-fed, hormone and antibiotic free 1000 lb animals that make 500 to 600 lb carcasses or whether we sell 800 to 900 lb carcasses with double hormone implants, the point is we are a concept, not an entity. So we got all these people together for a three day planning session. If you can imagine getting a group of ranchers and their wives to sit for three days and do nothing but draw up a 5-year plan, that was a little bit of a selling job. The ranchers are used to working in pretty much of a male-dominated world, different from being in a mixed group with a variety of interests and expertise. When you put such a group together, it is amazing what you can come up with.

As a result, our board of directors is by ranch, not by individual. Husband and wife both attend our meetings.

After that, it took a lot of action steps on the plan. We needed brochures, signs and labels. One of our concepts is not to need to raise a lot of money. We use volunteer labor and want to make the sale of the cattle support the program. We think the times of borrowing big money and making big money are past. That's how we got into the ranching business but we don't think it is in tune with the 80's. We want Country Natural Beef to fly on its own. Our capital investment was $100 per ranch and a heck of a lot of volunteer work. But in a group of 30 ranchers you would be surprised how much expertise there is that can be brought out. We have a graphics artist and a regular artist that designed our label and posters.

Then we got down to a feedlot discussion of how we would manage this thing. Ranchers have always wandered around the feedlot saying here are the kinds you want but this time when our extension beef specialist came out, the ranchers actually listened to him. The things he said meant something now that we were responsible for that product to someone who was going to eat it. That was a different story than selling to the packer; it now had our name on it.

We had more meetings and more discussions and more planning and follow up. We had an order-buyer join our group and a marketing man from San Francisco who happens to also be a rancher but who made his money selling products in San Francisco and whom we could not have hired for $1000 a day. But he spends a day with us for nothing because he believes in our concept of producers being responsible for their product.

Now we are down to the gist of the problem. All these previous details were good, but it really is the consumer we have to worry about.

(CONNIE) We had been in our first retail store for about 3 to 4 weeks. They were talking about us putting some of the extra money we got for our cattle back into advertising. I said to the retailer, " Do you suppose this is about the time we could share an ad with you people?". He said, "Connie, you have to

realize something. This building is mine, that coffin case is mine and I hired the man behind that cuts up the meat. The people that walk in front are the consumers, and I also hired the lady that collects the money at the check-out counter. That product is YOURS. It is your responsibility to sell that product." We had done all this, and it took me that long to really understand that we had to quit thinking of a cow or steer with its hair on, and start thinking of it as meat. One thing we found out, which I don't know why I didn't realize before was when we give the calf-hood vaccinations, we usually give them in the rump. Do you realize that we are poking that dirty needle into sirloin steak? We found out from the retailers. We asked what the white spots were that made so much waste on those good cuts of meat. They said that quite a lot of real good cuts of meat were ruined because we producers give shots in the wrong place.

(DOC) Our real job now is getting the word to the consumer about this product. We like to be located right next to the chicken and we have spent about 300 hours in-store with volunteer rancher people, men as well as women. They say that we are entering a high-touch high-tech era where people are so ruled by computers and machines that they really need some kind of personal response in their products and in their lives. We are learning a lot about consumers. If every rancher had to spend a day in a retail store talking to consumers, there would be a world of change in the feeder industry, and of course the implant people would be out of business. And it doesn't matter whether implants are or are not safe, but the perception of these consumers is unreal. We are in trouble as far as I am concerned. I don't think James Garner or Cybill Sheppard pumping beef up is going to be the answer. It will help and I don't mean to be negative but there is not a good perception of beef by the consumer.

Last week we got all our ranchers together for a meeting with our retailers and retail meat managers. We have 10 or 11 stores where we are selling our beef. The retail meat managers are kind of interested too. If you remember that chart Leachman drew with the big wad of consumers and the big wad of producers below, all running through the bottleneck created by the packers, these retail people are little just like us ranchers. It takes a fairly good retail store to handle 5 head a week, which makes 250 per year. It takes a fairly big family ranch to produce 250 steers or fat heifers. These retailers are the same size we are. They are little and no one pays any attention to them. This is the first time anyone has ever talked to them about what they were interested in. They were tickled pink to tell us about all these needle holes and abscesses they get in the sirloins. When they told Iowa Beef about it, Iowa Beef said just buy them and tell us what the damages are and we'll reimburse you. So when we sat these retailers down together and asked them what they thought their consumers needed that we could produce, they were interested. Our packer was there and he was interested. We're talking about different products with which we can perhaps fill a niche.

We aren't going to change the world but we don't have to change the world. All we have to change is a small part of it. If we sold every beef animal that was raised in the state of Oregon or in this province we wouldn't make a dent in the national supply. What we all have to work on together is getting something on the meat counter that someone wants.

We don't have any money, but these retail meat managers were used to all kinds of little bonuses from chicken producers and so on, so at this meeting we gave each a horseshoe and a horseshoe nail to make a point of the importance of detail, and each a weekend trip to a Country Natural Beef ranch with their

families. We have ten ranchers cooperating. Those retail meat managers are going to be on the ranches this summer and we are going to get some good communication.

We are pretty small right now. We have purposefully not tried to sell any more stores than these 10 in the last 3 months because we have some quality control problems to get ironed out and we want to be sure everything is right before we go into any more stores. We have the capacity to handle 15,000 head of cattle every year and last week we sold 8 head. So we have a long way to go. But the point is if we are sound and if were are going to have the money the cattle generate and if we have the input, rolling out and getting bigger is easier. If you can't do a good job of running 20 cows, you won't do any better with 2000. If we can run a few head right, we should have no problem in rolling out to handle all the cattle we have.

One of our members is an old bull-dogger, the best in-store salesman we have. He weighs about 260 lb, is over 6 feet tall and says, "You just got to take those ladies and lead them right over there and show them what you got". He sold a carcass in a day by himself. When he speaks, they listen.

Connie mentioned Gracie before. We don't know how old she is, there is nothing old about her thinking, but her husband was born in 1921 and she is about 4 years older. We visited their ranch in the far southeast corner of Oregon. She has a good cougar story. They noticed during the summer three years ago that the horses were all nervous and kept looking at the hill and spooking. The young dog was scared and wanted to get into the house. One morning about 10:00 am, Gracie went over to the window to water her avocado plant, looked out, and there was a great big cougar, right under the window. Gracie keeps a rifle with a scope under her sofa. She shoots coyotes on the calving ground. She grabbed her rifle out from under the sofa and out the back door she went and the cougar ran around the house one way and Gracie came around the other way and boom. I asked her if she was scared. "Why no", she said, "If you can hit a Rockchuck at 400 yards, a cougar sure isn't much of a target at 30 feet".

That makes a good point. It takes nine months from the time we put a bull with the cows to get a calf and probably another 18 to 20 months to when that animal is ready to go to the packing house. So that is about 27 or 28 months, and in 28 days from that 28 months, that beef is all eaten up. It is in the packing house for about a week and in the retail store for about another week. They can age it and store it for about a month, but they want it to roll over. So if we can control our beef for the 28 months, which many of us do, why on earth can't we control it for another 28 days?

DISCUSSION

QUESTION. Are you getting a price premium for your product over what regular beef sells for?

ANSWER. The ranchers are getting $1.00 per pound. We don't worry at all about what the market does. Basically, what it amounts to is that we want to separate ourselves from the commodity of beef. Beef really doesn't make a very good commodity anyway, because it is all different. So it is like we are selling something that has nothing to do with beef. Right now, the price being returned to our producers is $1.00 a pound and we charge the retailer $1.87 a pound in the box. We have established that price and we don't care what IBP (Iowa Beef Packers) does. We haven't changed our price for 6 months. And IBP doesn't care either. That makes it about 20 to 50 cents a pound higher to the consumer and there is about $80 to $100 extra money in there that comes back into our organization to run the

program. That is how we pay for our labels and phone calls. We looked at a survey that said 70% of consumers would pay more for a beef product they know does not contain drugs and hormones. Twenty-two percent didn't care and 8% had no opinion. Ranchers were also surveyed. Forty percent of the ranchers thought people didn't care. We don't know what is out there because we never went to the right places.

QUESTION. If you were selling on the hoof, would you get $1.00 a pound?

ANSWER. Yes, and we are going up in about a week to $1.05 to the ranchers because our whole purpose is getting as much back to the rancher as possible. But our signs and brochures take some money. We feel like we are pioneers. Up to about 6 weeks ago, I was getting upset because a lot of our ranchers hadn't been to the packing house yet. I couldn't understand why. Our neighbour said she didn't want to go there. I guess Doc and I have been the scouts for this wagon train.

One thing I might mention, IBP price was about $96 per cwt. So we have been above that most of the time with our $1.00. So from the producer standpoint, we are making a pioneering effort and it is not costing us anything. And the major thing we have gained in the co-operative effort is that people will bring say 30 or 40 head in to start feeding and then this fellow who is the order buyer has a whole bunch of cattle there and he has been marketing the ones that don't fit our program better than we would have otherwise. So as far as the producers are concerned, that is more of a benefit than the $1.00 a pound they are getting for the ones that fit. If ranchers could work together, like in your province where you have so many farmer-ranchers with small herds, those benefits exist.

QUESTION. Who certifies this as hormone and antibiotic free beef?

ANSWER. We do, by signing affidavits saying we have not used those products. Actually I don't want to get into the hormone/antibiotic business. We are not saying that these products are not safe, that is not the point. The point is if you use them properly you can't test and find them anyway. So it isn't that they are unsafe. The point is that a bunch of consumers don't want them. All these retail outlets have regular choice beef right along side of ours. They don't see a problem. They sell diet coke and regular coke and 2% milk and 1% milk and they sell post raisin bran that is natural and post raisin bran that is unnatural. It doesn't bother them. From a retailer's standpoint, you put a product up because a customer wants it. They don't think that because a customer wants one product, the other is inferior.

QUESTION. What difference are you getting at the coffin level in terms of the retailing. Is the retailer seeing a difference in customer reaction?

ANSWER. The retailers think most of our sales are in addition to their regular sales, which is what we had hoped for. We are tapping more into the chicken and fish market than we are the beef market. People who are beef eaters and sold on beef usually don't worry about hormones and what not. Our higher price is not a problem. Our problem is getting word to the consumer that our product is there. No one reads signs in the supermarket and we aren't going to raise money for a big TV campaign and so we are really working on innovative ways to get the word out that this product is there. In every other industry except agriculture, the producer is responsible for product advertising. I think our time is up and is in fact overdue.

PUTTING IT ALL TOGETHER EFFICIENTLY: A PRODUCER PANEL

Norman Lee, Rancher
Fir Mountain

Annette Morin
Purebred Hereford Breeder
Blam

Jim Torgeson, Rancher
Pierceland

NORMAN LEE

I'll tell you, I don't feel comfortable up here at all. We've been here for a couple of days now and all the different philosophies and research results have just boggled my mind. A lot of these things are very real and very easy to take back home but some of them I have a tough time identifying with. I don't have too much trouble identifying with Doc Hatfield. He's got less hair than me and Brothers, Oregon sounds a lot like Fir Mountain. I used to live in Alberta and we were pretty close to the highway. We got a lot of company we didn't really need because people were on their way to the coast or to California. Now if somebody comes to Fir Mountain I know they come to see me because Fir Mountain isn't on the way to anywhere in the world.

When we get into different research things, and different concepts about cattle, I wonder sometimes at the perspective. When a government man has done a lot of work, as valid and real as it may be, the ideas behind always have to be there. He never risked $100,000 of his own money to be wrecked. So we have always tempered what we hear from these sources with that in mind. It is just sometimes a matter of perspective.

Bob Sparling said I was down in Fir Mountain with several hundred cows - I only wish. Your perspective is different when you are a small operator than when you are a large operator. A lot of what Jim Leachman said makes awfully good sense to me, but it's difficult to incorporate simply because of size and partly because of another limiting factor.

We have dealt with limiting factors in the cow business here, of all sorts. I'm telling you, folks, the biggest limiting factor right now with me is poverty. Most medium-to-small cattle operators in Saskatchewan are dealing with that same very real limitation. It gets pretty hard to be innovative when you can't seem to see the dollar there to make the changes. If you can't see it, it's for damn sure your banker can't see it. So what we have tried to live with and what we figure is an efficient cow is one that is management responsive. By that I mean we look at, for example, Dr. Bailey's work at Manyberries and Brandon on specific breed crosses and a certain cross that went out in large numbers as a 2-year old. Maybe Leachman wouldn't keep that cow because she didn't rebreed on her own. I doubt if Doc Hatfield would keep her. But I will keep that cow because she is management responsive. I can put $20 worth of grain into her as a 2-year old, post-calving, and within 60 days I can get her to rebreed. She'll probably be a very productive cow for another 10 or 12 years once I get over that first hump.

It is nice to say that the efficient cow is one that doesn't need the extra management. A term the Red Angus people use an awful lot is comfort zone. I can't for the life of me afford a comfort zone. If I get up in the middle of the night and by doing so am going to get another 100 lbs of calf, I'll do it and I have to do it. No amount of hunts for the perfect cow can take that little extra out of me, so I'm gonna go for that Shorthorn-Simmental heifer that was culled out at Manyberries just because she is the one I want. I can put a little bit of management input in there and that is the cheapest thing I have - me. I can get good returns for investing my time. From where I am sitting with 150 cows, these are the things I really have to do. I have to control every bit of expense, at whatever sacrifice needed or I am going to go broke.

Efficiency seems almost lately to be kind of a bug. Its plausible but it has almost become a little bit faddish. Everyone is talking about that perfect cow that will take away all your management responsibilities.

I heard a bit of reaction to the hormones and antibiotics. We have areas in the cow business and one that has never failed to annoy me is the fact that we sit there at branding time with a calf down and a guy with a knife on one end taking out the hormone factory that we're sticking in the ear at the other end. We are also probably taking 50 pounds off the weaning weight of that calf by doing that. There are areas like this where we have an awful lot of room for improvement.

There are probably about 100 things I'm gonna wish I'd said, that I have forgotten completely because there has just been so much data here that it is pretty hard. I'm gonna have to read it to know I was here.

ANNETTE MORIN

I'm not really comfortable up here either. My husband and I along with our 3 children run a mixed farm from which we derive most of our income from the cattle. We started off some twenty years ago with a dairy herd and a small herd of commercial Shorthorn-Hereford cows. We phased out of dairying and increased our beef herd. Because we raised our own replacement heifers, it seemed we were always replacing our bulls so we decided to start a small herd of purebred polled Herefords. We are now with a purebred herd of 60 polled Hereford cows. In 1977 we decided we had better get into better records so we joined ROP. We keep approximately the top third of our bull and heifer calves. Some of the bulls go to the test stations in Saskatoon and Vermillion. Others we keep at home. Our preference is to sell yearling bulls but we do keep some over for sale as two-year olds.

Efficiency on our farm is a cow between 1200 and 1300 pounds. Fertility is very high on our list of priorities as we run a tight AI program for the first 3 weeks of the breeding season. We generally have about 85% conception with AI and then use cleanup bulls. It is not unusual for our cows to cycle 3 to 4 weeks after calving. We pregnancy test and open cows and heifers are culled, with the odd exception of a 2-year old that has weaned a very heavy calf. Our cows are expected to wean a calf 40 to 60% of their own bodyweight and must have adequate milk production. They must have good wintering ability as our cows have no sheds, only windbreaks. They are in a barn long enough for their calves to be weighed, tattooed and have a shot of Vitamin A,D and E. The cow also receives a shot of Vitamin A, D and E. She is expected to calve by herself, have a good mothering instinct and an even temperament. We don't keep any animals that are problems to work with. Our cows must be good foragers and have good feet and legs.

We like to have calves that will be heavy enough to go from fall sale into a feedlot to finish at 12 to 14 months of age. We strive to have our cows wean a fairly heavy calf which will go on to gain 2 1/2 to 4 lbs/day. We follow the practice of early weaning so our cows have time to condition themselves for winter.

We test our feed each year and have our rations formulated with the help of our local ag rep and livestock specialist. At present our cows are getting 20 lb DM in the form of hay and alfalfa. After calving they will receive an additional 4 lbs in the form of rolled oats. Feed is readily available along with 1:1 mineral and trace-mineralized salt. They also receive Vitamin A, D and E at weaning and at calving.

So on our farm, this is an efficient cow. There is no doubt in my mind that there will be more efficient-sized cows on our farm in the years to come, not necessarily purebreds.

I found Doc and Connie Hatfield's presentation yesterday very informative. And certainly for their environmental conditions it would be nice not to have to feed cows for 6 or 7 months. Both their situation and Jim Leachman's, as far as their practice of never assisting a cow is quite different from ours. We are quite willing to put in that extra effort, not necessarily for calving difficulties but for calving problems such as breach births or heads back.

I found it very interesting that the Hatfield's have their heifers calve along with the cow herd. This is the same approach as we use but we are constantly told heifers should be calved out 30 days before cows to give them the extra time to rebreed.

After the presentation from Dr. Wilton, I found most people to be quite skeptical about test-station bulls. We believe test stations are very effective in evaluating bulls. Bulls presented for sale will do a good job of breeding when they are handled in the manner they are at the test stations here.

I agree with Jim Leachman that most purebreds are already too big, but the show circuits have dictated a lot of that. We maintain that the animal that tops the shows is not necessarily the animal that you want a herd of at home.

Louis Baudin's fall calving really intrigues me. But as our banquet speaker said we would have to see it set as a goal and have a lot of positive thinking. If it works it would be nice not to have to worry about scours.

The Country Natural Beef is interesting because I believe there is a growing demand for this product. More and more urban people are becoming alarmed at what they call growth stimulants, not only in beef cattle but in other commodities as well.

Rick Corbitt's talk on nutrition was very interesting. We have done feed testing for several years now but don't seem to be able to get anyone else in the community interested. It is not because it is hard to do, it is because they can't be bothered. Also, after hearing what Dr. Corbitt said about selenium, I wonder if we at home aren't feeding unnecessary selenium.

I hope all of you have enjoyed this convention as much as I have. It has given us all a lot of food for thought. We just have to evaluate how it can fit into each of our own situations.

JIM TORGESEN

When Bob Sparling asked Norman, Annette and I to be on this panel, I wondered, why us? Now I know. When you mention cows, what sorts of things come to mind? Well, if you're interested in color, we have that in Norman Lee. If you're interested in femininity, we have that in Annette Morin. And if you think there should be a little bull, here I am.

I am supposed to spend a few minutes telling about myself. I noticed that when most of the speakers were introduced they mentioned something about their formal education. Well, I'll tell you about mine. I got as far as grade 10 in a public school and I graduated from the school of hard knocks. By golly, you may not get a diploma there but you do get an education. I come from Pierceland, an area to the northwest where practically no grain is produced and when you come to the sign, don't miss it or no one will ever find you. You'll just probably keep on going until you reach that other US border that goes across the north end of this country. Combines are as scarce as hens' teeth and elevators don't exist. We have long cold winters as a rule; this winter is an exception.

I run a few hundred cows and sell calves in the fall. I've tried backgrounding calves and carrying them to long yearlings, but selling them right off the cow works best for me. It might be hard for some of you to imagine, but hay is often cheaper than straw in our area. We cut wild hay for bedding and we buy some straw but we don't need Rumplestiltskin to spin straw into gold up our way because it's gold already. We have to truck it about 30 or 40 miles so it gets expensive. We grow a lot of tame hay now but we still produce about half of our feed from wild hay grown on marsh land. But as Dave Bailey said, if we could feed our cows like the National Research Council says we should, they would all starve to death. Much of our feed is low quality, but when we feed lots of it, the cows seem to do okay. Our pastures are basically bush pasture that can handle only about 7 to 10 cows per quarter section. Managing a herd of cows in a pasture this size is a bit of a problem and getting the cows home in the fall is not always easy. We only take one cut of hay. When the cows come home in the fall, we turn them into the fields. This really helps because bush pasture only grows for about 3 months.

All our cows are crossbred. I use Charolais bulls. The reason is simple. Buckskin calves bring the most money. Charolais cows half-crossed do well for me but when the percentage gets much higher, fertility does become a problem. It doesn't make much sense either to have a 1600 lb cow and her feed requirements when she doesn't produce any more calf than a 1200 lb cow, when the smaller cow usually has better fertility. One of the real problems I have is getting replacement heifers. I still keep some Charolais cross that I choose from the middle weight calves rather than the top end. I wish I could buy replacement heifers just like I buy my bulls, but so far I haven't been able to.

I don't have as good a weaning weight as some of you, but my calves born in March and April will consistently come in over 500 lbs. Considering that we can produce them cheaper than some of you, I guess that's not too bad. We've increased weaning weight by over 100 lbs since we started using Charolais bulls. We've had to change our management somewhat. Fall pasture seems to have helped the most. We want our cows going into the winter in the best condition possible and then feed them all they can eat. One thing I do that is a bit different than some of you is feed for 2 days at a time. My original idea was to get away from starting a tractor every day but I found this system to have other benefits as well. I feed right on the ground and don't bother to roll the bales out. When I fed every day, I had a distribution problem. The biggest and bossiest cows got the best feed. Now they all get a feed of good hay on day one and they all have to clean up the leftovers the next day. I personally don't like feed gates or electric fences, nor do I like to feed in a corral. Contrary to some people's thinking, I believe the cow should walk a quarter mile or more to water. The exercise is probably good for her.

I guess now I am supposed to be critical. I can think of a better word to use but I hope I can at least be constructive. I know I should confine my remarks to what has been said here but I would like to tell you about an article I read by Trevor Jones that appeared in the last issue of Farm Light and Power. It sort of proved a point. After writing a pretty good article, Mr. Jones stated that brood cows can use snow efficiently and can vary that with a lower access to water. I think Mr. Jones must be talking about a different area than I am familiar with. I'm sure that 90% of the people north of here or North Battleford would disagree with him. The problem is two-fold. First there are some people in our area who do graze cattle in the snow. After reading an article like this, nothing can discourage them from this poor practice. Secondly, and this applies to people at this convention, be careful not to include something like this in any article you write without being more specific. Unfortunately some cattle producers look at something like this and as Norman says, we cattlemen tend to be the biggest skeptics in the world. I hope no one finds my remarks too harsh, but all too often I've heard cattlemen say that those guys in research stations and in Regina know nothing about raising cows. And we've actually looked at something that proved that point. Credibility is very important and nothing should be said or done to damage that credibility.

As producers we have had an opportunity to hear from some of the best people in the business. I think we should listen carefully and with an open mind. It can't hurt to reiterate what Louis said about the fellow who was getting after him about fall calving. He said if you want a lot of frozen teats and swollen udders, go ahead and calve in the fall. Louis asked him when he calved, to which he replied January. Now how a cow that calves in the fall would be more likely to freeze her teats that one that calves in January is interesting. I suspect that his biases were showing. January calving is an accepted practice and at least to some it barrs none. I would like to say that there are no doubt many different reasons why fall calving is not for everyone. But just the fact that it breaks tradition is a poor reason to reject fall calving or any new ideas we may hear.

Dr. Cates talked about an efficient bull. He said that about 48% of the bulls in the test station are culled, many for bad feet and legs. Bad feet are a problem for us. When these bulls have to travel over all this bush country they can't get the job done if they are wandering around with bad feet. But I don't know what the answer is. We

like to buy these bulls but we are scared to buy them if they are overfed or suspect they were. We just can't afford to take a chance. I like to buy a bull, if I can get him, at about 5 years of age, one that someone else has bought and proven, one whose heifer and bull calves I can see, and one I can get for about a third of the price.

Dr. Bailey said something about matching the cow with the kind of feed. I agree with him. But I did have some problem with his and Dr. Wilton's reports. All the charts and graphs and facts and figures were overwhelming. Someone told me what a research scientist does best is research. Well, we got our money's worth. If there was no other way to say what they were trying to say, well like a farmer said, if only one cow comes up for feed, you don't dump the whole load of hay.

Norman and Annette covered most of the other points I had in mind. I'd like to thank Mr. Sparling and the rest of the committee for inviting me. I think this is the best seminar yet and this is a tradition that I would like to see continue.

DISCUSSION

QUESTION. I think we have a problem with grasser cattle in this country. This year it was a particular problem because they were all on heavy feed, but even in the past these grasser cattle have either been big calves in the fall of the year carried through or they have been calves that have been mis-treated all winter. Do you think what Louis Baudin was telling us is an opportunity or alternative for grasser cattle?

NORMAN. Hell, I don't know. Our country is full of grasser cattle of all breeds, but we very definitely got away from that by trying to produce exactly what the buyer wants when it comes off the cow. I simply don't have any experience with grassers. The whole idea and method of fall calving is intriguing but I couldn't make it work for me, simply because of the weights we're getting now. Were we to do that and market them at market weight, we would be looking at far too heavy a product, which I don't think we would get the returns for.

ANNETTE. We don't grass any calves either. I find fall calving very interesting and would maybe be willing to give it a try. I think probably there would be a market for those calves as grassers. There are a lot of people in our country getting out of cows and buying grassers.

JIM. One of the things that intrigued me was that perhaps this would be a good way to get replacements. I am always interested in replacements. I think heifers that calve at 2 1/2 years of age might just be able to handle that first couple of years better than those I am using now. Another thing, calving out 200 or 250 cows in one shot in the spring is a pretty big job for just my wife and I. It's a little more work, but by calving in the fall I would at least spread the work load and then we could carry those on to grass and sell them that way. It would probably be a good idea.

QUESTION. Annette, you mentioned early weaning. How early do you wean?

ANNETTE. Depending on the weather. Last year it rained so much we weaned the calves because we couldn't combine, about the third week of September.

QUESTION. The thing that bothers me is I sell calves off the cows in the fall too and the problem I see is that buyers are too color-conscious of the calves we produce. What can we do about it? How can we get buyers to forget about the color and look at the quality? With things the way they are, it makes it difficult for us to get into a crossbreeding program.

JIM. Yes, it is tough and like Norm said, poverty is the underlying factor here. I always told anybody I would cross a goat with a kangaroo if he would pay me enough for it. A uniform calf crop is good, but right now I have to make a living.

NORMAN. If you're looking at a bunch of crossbred cows and you want uniformity that is terminal, you don't really have a problem. You can identify what the market is demanding at that terminal end and can get enough uniformity simply by using that type of bull and will still get your heterosis kick out of those cows. Maybe they won't be red, and will have to be white or buckskin, but if that is what the market demands, that is just what you and I will have to raise.

QUESTION. You said you were interested in buying replacement heifers. How much are you willing to pay for them and are you willing to accept second-string? That rancher you buy from has to keep his best animals in his own herd.

NORMAN. A lot of this has to do with the rancher's own program. It doesn't bother me to be looking at one man's second cut if his second cut is better than my first cut.

JIM. I want to go out and buy the best heifers I can for the least amount of money. It becomes a bargaining thing just like selling our calves. The buyer comes out and dickers and that's it. I'm not going to bring home something that is worse than I'm turning away but I would think there are people in the country who might want to raise these replacement heifers and have them for sale. If that ever happened, I would be interested in buying and would pay a premium if I could get the quality I wanted.

QUESTION. How much premium for a good bred heifer?

JIM. How much quality do you have?

QUESTION. The kind of premium I would want is $200 above market price to cover the cost of my bulls and of you coming back to me if that heifer doesn't work. Will you pay that?

NORMAN. I think the poorest place to try and save money is on your bulls and the second poorest place is on females. I will pay that extra $200 because if the quality is there and if that animal is exactly what I want, I'm gonna get probably $100 to $150 per year back on her for the rest of her life. If I try to save a dollar there it will cost me. So yes, I'll pay it.

JIM. I agree with Norman in principle. I can't put a specific dollar amount on it, but I will pay a premium.

QUESTION. As producers at different levels we need all the margin we can get to try to maintain this industry. I agree that we are all willing to pay more money for this hypothetical heifer, but the question is can we afford it? Is the money there to do it?

NORMAN. From a commercial standpoint, it has to be there. You simply can not keep a poor-producing cow and if you have to pay a little more to get a good-producing cow then you have to do it. The money has to be there. If it isn't I'm already broke.

JIM. I think it is a real problem to try and buy something that isn't even here. You can't buy a tractor or car or anything else without knowing something about it. I don't think we can come up with dollar figures at a time like this. We want to buy the best animals we can afford, and try to relate price to performance and to what we can afford.

ANNETTE. I don't know about a $200 premium but we paid a little over $1000 for some replacement heifers last year.

QUESTION. We all realize how important marketing is. Have you ever thought of getting other producers in your area to combine and make a bigger sale?

NORMAN. We are working on a green tag sale right now. It is not quite related, but almost. The idea of car-load lotting and this type of thing is very real and we are doing that. But as far as taking it further, we are at the mercy of what the feedlot man wants and we are forced to try and produce what he is going to pay the top dollar for. If we can get enough guys together to do that, okay. We are thinking now that we can add a little profit margin by pre-conditioning. We're trying that. We'll try anything. I'm like Larry and Darryl and Darryl.

QUESTION. You guys keep saying you are at the mercy of packers and feedlots. Why don't you go the Country Natural way?

NORMAN. That is a nice niche but if we all try and do it, it is no longer a niche. I don't know if I have the capability to do that or the selling power that these people have. I don't have the charm!

QUESTION. They are filling a little niche in Oregon and you are sitting in Fir Mountain. Now I don't know where it is, I've never been there, but I suspect it is a little ways away. They are talking about 10 retailers they provide beef to right now. There must be 10 within 200 or 300 miles from you. I can't see how you can just sit back and look at this concept and say that because you don't trust your own instincts and don't know how well you can do, it isn't something you can try.

NORMAN. I'm not a feeder. I'm strictly a cow-calf man. As soon as I get into an area where I do not have expertise, I get nervous. I do not feel confident about finishing cattle.

ANNETTE. Country Natural Beef is probably a very good idea, and something there will be a demand for. We don't finish cattle at this time either, but consumers will want it.

COMMENT. I think the point here is that you are the cow-calf man, but you must have a neighbour that feeds. I think that is what Doc is doing. He doesn't feed cattle either, but they have a feedlot in their organization and have pulled together people in the neighbourhood in a business arrangement. It is more the idea of people working together in a group, you producing calves, your neighbour feeding them, and you both marketing the finished animals; not doing it all yourself, because you can't. By yourself, you are at the mercy of the buyers and the packers.

DOC HATFIELD. Yes, that was stated very well because the last thing on earth I would ever consider doing is feeding calves myself. I have to point out that this is a concept and an idea and a people thing. We don't plan to have great success right now. The spinoff thing is greater than the actual sales. We deliberately have not expanded anymore right now.

QUESTION. But if it works, you will expand won't you?

DOC HATFIELD. Obviously yes.

QUESTION. Will you ever hit Saskatchewan or do you think the beef producers in this province could maybe try to fill that niche here?

DOC HATFIELD. We are not interested in getting big and that is the point. We want to cover the market in our area because in this kind of association, getting bigger is not necessarily getting better.

QUESTION. How much will consumers be willing to pay for this beef?

ANSWER. They will pay and in fact are. Jim Wilton says it is happening in Ontario right now, on a small scale from farmer to consumer. But they pay for that.

COMMENT. I can't help but comment on the fact that housewives are willing to pay more for a so-called clean product. My sister has a reaction to many foods and I know there are many people like her. Her allergy reaction is not to food, but to stress. She needs a reinforcement of the idea that the food she eats is pure and natural. This marketing concept fills that bill.

QUESTION. Are the people that are willing to pay a premium for this product willing to finance getting these cattle to market?

NORMAN. That was my next point. You see we come back to poverty as the limiting factor.

QUESTION. Norman, don't you have $100 to invest like the Hatfields did?

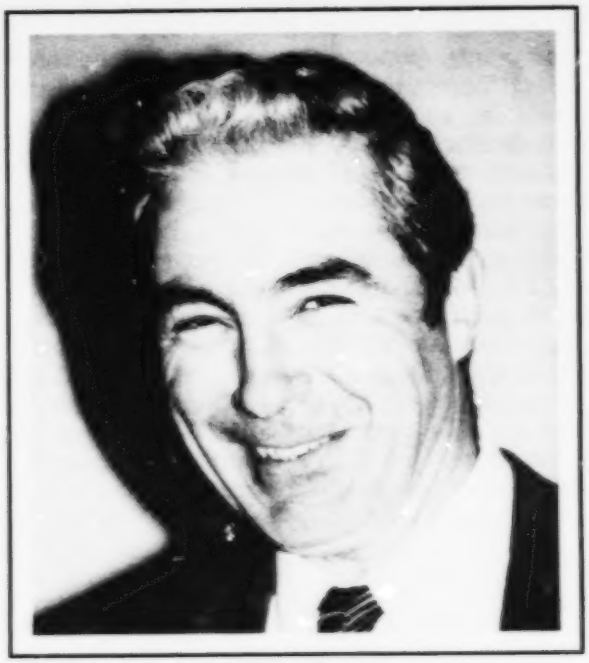
NORMAN. But my marketing would be put off to further down the road and maybe I couldn't wait that long for the cash. I sell those calves in the fall because I need the money. My banker says so.

HATFIELD. This is really neat. This is exactly what the men in our group said and that is why we sent Connie to Portland to get rid of her. There were all kinds of reason why this wouldn't work. Yet, you see the women in here see it differently because they are looking at it from more of a consumer standpoint. Sometimes the things we understand, we understand so well because we've done it forever. It's different thinking, that is the process. It was the thinking that worked. We had an interesting visit from some people in Utah last week. They run a big ranch and have an intensive grass management program and were having a hard time figuring out how they were going to brand and castrate with their grass management, so they just decided not to. Everyone in America brands, but they just didn't. Period.

QUESTION. I don't know if producers can afford not to implant?

COMMENT. I will pay 50 cents extra and I can guarantee 50 more women like me that will pay 50 cents more per pound of hormone and antibiotic free beef.

THE EFFICIENT COW OF THE FUTURE
HIGH TECH OR LOW TECH



Dr. Bob Church
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INTRODUCTION

In this presentation I am leaving out a whole great big middle ground that represents how most of you operate. I've done that deliberately. The high-tech and low-tech are both ends of the spectrum. They represent two options. They represent ways in which most of you will utilize some or all aspects, depending upon your particular operation. In particular, the thing I want to really impress is that I am an absolute believer that there is a horse for every course. When I say that, I mean you take your geography, your climate, your management, your financing and your experience and you put that together and you don't give a damn what Mr. Jones down the road is doing.

Let me give you a little example of how things have changed, and they don't always change for the best. For the last couple of years, I've developed a little bulge through the middle. My kids give me a hard time about it and it has a funny history. The history is that we got a big round baler and I don't have to throw bales anymore. I have a front end loader that does it. It shows up right here around the waist. There are all sorts of impacts that result from management changes we may make.

There are two areas, high-tech and low-tech, that I want to talk about. I am involved in both areas. I drive from our laboratory and our high-tech operation back home to my ranch, which is an old-time, low input, low-tech ranch. In both cases, which are extremes, we've made money, but we have done it in very, very different management fashions.

I hope that in the next few minutes I can tell you a little about how we operate. I'm not saying we have the answers. I'm simply saying that in the operations in which I'm involved, in the foothills of southern Alberta, in the

high country of Wyoming, in western and northern Ontario, and in the Australian Outback, it works.

THE CONSUMER

A few years ago, as an old cowboy I was really disturbed by the fact that I was never served beef when I went out for dinner to my friends' and colleagues' homes. That started me looking a bit at where we are in this cow business. I intended to go back and take an active role in our family operation and start my own, but was concerned about no one wanting to buy our product.

My basic conclusions are that in our beef market in the east, consumption is dropping. As we heard this morning, baby boomers are turning away from beef as it has been presented to them in the supermarket and in addition to that, the competition is revving up. All you have to do is look at the meat counter of any store here in Saskatoon and compare it to what you remember 10 years ago. Look at how little that space is devoted to fresh beef today, compared to how much is in chicken and more importantly, to how much is in specialty meats. What it tells you is that the retailer doesn't care what he has on that shelf. He is simply looking at dollar turnover per square foot of shelf. I was scared that the coffin box was going to be exactly that and 6 feet under for us in the beef business if we didn't have a pretty good look at our own situation. In Saskatchewan and Alberta, our quality product is shipped to Montreal. I don't think it's any secret that if you want to have access to the quality beef that we can raise in western Canada, the first place to go is the hotel, and secondly to Steinburg's in Montreal because there is as good a chance of getting a quality product there as anywhere.

Quick service is a fact we have to live with today and must be reflected in our marketing programs. Our basic resource is two-fold. We have our cows and our grass. We can have all sorts of different combinations of these. Our cows are competing against the rest, which is kind of like against the world. Then there is an aspect of the beef steak and quality, and veal or baby-beef. Over the last while, I have been increasingly concerned with the way the packers have been roping us around. A market survey and taste panel told me I had a product I could be proud of, could raise, and also, when I put my consumer panel out in the big cities, a product I knew many people liked. There were a lot of misconceptions about beef and there were a lot of people who if they had access, made up quite a good consumer demand. But then I looked and saw the knot hole all our products had to go through. What comes out the other side essentially has the most profit, like sausages. That made me hesitant.

That is the basis of a story. Over a period of 10 years, I kept score when we went out to dinner. I asked one hostess why she didn't serve beef. She said she had been embarrassed once. She came from a family where a roast was the way to treat company, so she bought a roast. It was so tough she needed a hunting knife to cut it and it had no flavour. She was so embarrassed she vowed never again. So when we went out to dinner we were served beef products like lasagna, rack of lamb from New Zealand, poultry in any form and occasionally chili. In a period of 10 years of dining with urban hostesses, we were served beef only once, other than stuff that came off the barbecue, by which time we had so much of the contents from the cans that it didn't make any difference.

The point is that the consumer was out there. But when the liner pulled off our cattle ranch with our calves, we said good riddance instead of looking a little more at what the consumer wanted.

REALIZED MANAGEMENT

The second point I want to make, is that you can make money in the cow business in a number of different ways. The key is that your whole management profile has to be put together in what I call a profitability chain. Nothing magic, just using a little of the common sense every one of you uses every day. This chain may be driven in current times by poverty, but there is a lot more, such as financial resources and new management tools, which leads to realized general management (Figure 1). It is not necessarily what you think you're doing; it is what is basically on the bottom line, the dollars and cents that your banker sees that is your realized management.

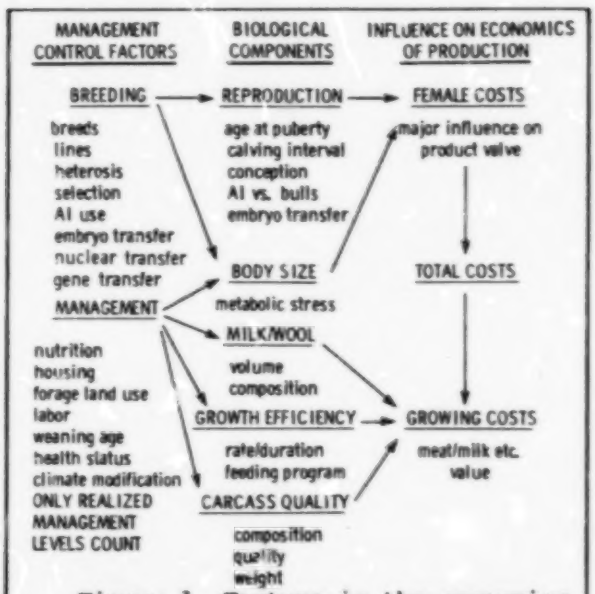

Figure 1. Factors in the economics of animal production.

Let me tell you a little story on that one. I advise for the Alberta Development Corporation which is a farm lending corporation. A young fellow had lots of hope for his farming operation. A few years ago he quit feeding a few hogs and quit feeding a few cattle and got rid of his cow herd and let his fences go down. He was going to become a grain farmer. Well that's great, work from April to September and spend the other 6 months on a great kick. I suggested he should feed a few cattle with the 65,000 bushels of barley worth about $1.00 or $1.25 that he had piled on the ground. He said the banker wouldn't give him any money to buy a feed wagon and a mixer. That is a philosophy. I invited him down to my ranch to see how I feed my heifers. I use 5 gallon pails. My dad did too and my grandfather did before that. I have a great time, I assure you, driving by the implement agency saying I don't need that equipment.

That won't fit every operation, but is an example of realized management. Other factors affecting realized management are animal health status which is a function of your herd and your organization, animal genetic potential, and so on (Figure 1). You put them all together and do what makes the most money for you.

Lets have a look at some of that. I think the best example is a crop example. A year ago we were pretty dry. Just north of us there was some rain. Bill had the best stand of wheat you ever saw, looked like it would go 40 bushels, with not a wild oat standing. It was his whole pride. The guy next to him had a stand that didn't look as good, less bushels, a few wild oats and so on. All year, while Bill bragged about his crop, Jerry just sat back. Last fall, Jerry, the fellow with the poorer crop, let us in on a secret. Bill and Jerry had agreed that it was a good lesson. The crop everyone admired lost money, but the poor crop made money. The moral of the story is it is only with your management, with your input costs and with your sales that you and your banker know what your realized general management and profitability are. I am afraid we got into a socialized situation where we are driven by product advertising, by what everyone is doing, and by management that doesn't necessarily fit our situation.

Let's have a look. Practically everyone in the extension departments has been telling me, if you want to run your cow herd, you identify your productive cows. I've been in this purebred business all my life. I don't yet know how to identify a productive cow.

Then you cull the unproductive cows. Well, I know what that means. That means a cow that doesn't bring in a calf in Wyoming or Alberta goes down the road. But we wouldn't have any cattle left in Australia if we did that.

Next, you establish a health management program. Great. There are many times when I need that, much of which is common sense. A lot of our management of cattle and cow psychology and cow handling facilities are playing right into the hands of every pharmaceutical agent and vaccine agent we have. So it is a two-way street. We have three different health management programs. One is zero health management. One is close to zero and one has everything in the book.

Then you establish a beef improvement program. I don't know what that is anymore either. I used to have all the answers but now have none. Everyone of you people will have answers that work in your programs. That is the bottom line.

LOW TECH OPTIONS

Our home base is in the high foothills of Alberta. Our native grass is not available until June 15. Our problem management-wise is providing some opportunity to keep our cows in condition so they breed back. That means we have some very different kinds of approaches. Over the years we have been involved with 11 different breeds. In our zero-plus-1 managed herd, we have 140 cows that calve by themselves. Any breach births or dead calves, and down the road they go. We breed every heifer on the place for 40 days and put open heifers in the feedlot. Cows and heifers are run together and calve together. If they don't wean a calf, down the road they go. I can tell you, I needed another income to stay in business when we first implemented that program. But now that we are rolling, we're doing all right.

We have to compete with the Australians, New Zealanders and Argentineans. They raise grass-fat steers. They can really grow grass, but when I see their management and health bills I am not so envious. Ethiopia and other areas like it in the sub-tropics have great potential for red meat production if biotechnology can help eliminate some of their problems that limit production such as hoof and mouth disease and tsetse fly. They have the potential to become red meat exporters.

In our Australian operation, we have zero inputs. We run our cattle on about 1.7 million acres. We market what we can catch with a chopper once a year. We marketed 11,000 head of cattle last year, grossed $46 per head and made money. It is called manufacturing beef. The cattle have a 3-day trip in a truck-train up to the meat works. The first time I went to the meat works, I was shocked. Twenty-five percent of the meat was carved out because it was bruised due to the damage done by the horns these cattle wear. High management in this environment means putting a polled Scoutmaster or Brahma-cross bull on them to knock some of the horns off and it means the 4 Aborigines we have do three things. We don't castrate, we don't vaccinate, we don't dehorn, we don't do anything except sell what we can catch once a year. Our aborigines shoot mickey bulls, water buffalo and kangaroos. That is what management is in this environment. The cattle graze out three days from the water hole, graze back three days and spend one day around the water hole. How old are the cattle? Well, some are calves and some may be 10 to 15 years old. If a cow is 10 or 15 years old, it

tells me two things. She is smarter than to get caught and she didn't have a calf other than about once every other year, to preserve herself. Some cattle will also hang up a reasonable carcass. So that is the end of the spectrum I call the low-tech .

In our Alberta operation, I realized in about 1974, before it was fashionable, that the ultimate to zero till was a beef cow. No worry about soil erosion, a rumen to use the roughage nothing else can, self-propelled, gets in calf so is self-reproducing, and produces a whole range of products. That is why I say our grass and our ruminant give us an advantage on the long run. The cattle on our Alberta operation have a minimum amount of feed, and winter with little supplement. To do that we discovered another thing that was dead wrong according to everybody else. We wean our calves the first week of September. If we can let our cows put on some condition in the fall, they reproduce better.

A MARKETING STORY

In 1974 we decided there was a move. Wearing my doctor's hat I saw more and more people sensitive to antibiotics and with sensitivities to a whole bunch of different things we didn't understand. I also had a lot of questions from people asking what they should eat. At the same time , those great medical journals like Cosmopolitan and the National Inquirer were saying beef is bad, cholesterol is worse, and fat is even worse, and they were being read. I decided I was in the middle of a wreck and was producing a product the consumer didn't want. I had already known the consumer wasn't happy with the quality of our product.

In 1974 we started producing some natural product. We raised some steers off grass, with a 40 to 50 day feedlot period. We went down as far as a feedlot in Colorado to see if we could get our cattle into a feedlot for 40 to 50 days, a bunch strung out over the whole year so we could supply a market. He said no, he couldn't make any money doing that. So we fed our own. We got together and put up a little feedlot. Then we went down to Montford to see if he would kill our calves. He asked how many we had. We said with about 4000 cows, about 1000 to kill because we didn't want to get hung on these things. He said no, particularly when I said I didn't want any triavac anywhere near and I wanted them hung for 3 weeks. We made a deal with a small packer who had no room to hang them for that length of time so we rented an old fish plant in Los Angeles to hang them.

Then we went to the retailer and asked if he would be interested in this natural product. He asked how much he could get per foot of coffin space. At that time I didn't even know what coffin space was. So what did we do? This is what you can do when you don't know anything about the business. We bought an old Burger King. We didn't think we had identified the market. We thought we were in competition with the steak houses because in that market you go into a steak house to have a good strip steak. Can you buy a strip steak in the average supermarket? NO! So we said we only want to market round steak, T-bone and porterhouse on top of the loin, which are recognized as being quality products, and filet and strip steak. We couldn't even find a butcher. We had to import two German butchers who knew how to bone out a carcass and produce these products.

Then what about our marketing? Well, we were dumb enough not to go to the retailer. Our store is a drive-in deal. We don't want to have a store in the usual way. So you drive up to what looks like a calculator. Before that you will have picked up the phone and ordered, for example, a 10-ounce strip and an 8-ounce filet and have given your credit card number. When you drive up, you punch in your credit card number

which tells us who you are. The girl at the window hands you out fresh, no frozen - all fresh, 21 day-hung beef wrapped in old fashioned butchers' paper with a little brochure on it telling you how to handle it. Our market surveys say that within an hour that beef is eaten.

We didn't know where to put the price either. So we said well, there is no use starting at the bottom because you have a hell of a time coming up, let's start at the top. We went to the supermarket. Steak was $3.00 a pound so we charged $6.00. That is what we do, double whatever the supermarket price is. We have never received any price rejection. It is a little bit of a gimmick to suit the perception that it is a natural type beef. In Canadian terms we run on a break between A1 and B1, which is low-choice high-good and yield 1 to yield 2 on the American grade system.

Consumers won't quite accept yellow fat yet. That is just because we haven't spent enough time to find out where yellow fat is the thing we should be marketing. In New England you can't sell a white egg. There are blue-shelled eggs that sell for a premium. In western Canada, you can't sell a brown egg.

With these 'natural' cattle we meet consumer perception. We sell these cattle by word of mouth. We get people in for the first time by satisfying their fear, and it is real, of antibiotics and such. But that is only a small part of the cattle business so you people in the hormone and drug industry, don't pack up and leave. There is a big market for you in breeding stock and a whole bunch of other cattle. But we satisfy the perception. There is enough scientific basis for the perception to be real that the misuse, not the proper use, but the misuse of antibiotics and the misuse of steroids is a problem.

HIGH TECH OPTIONS

Let's change gears a little and look at other options- high-tech. The oldest embryo transplant center in the country was developed because of a demand for exotic breeds of cattle. The technology was there; this was the application. Embryos can be frozen and shipped world-wide. Last year there were over 10,000 seedstock embryos shipped out of Canada. It is a fair kind of export market that hasn't even been tipped. It is a market that exists for a select group, part of the high-tech industry.

Other techniques involving what is generally conceived as genetic engineering, are now starting to come into force for the livestock industry. We can take an embryo, like one of those in the photo (Figure 2) and split it into two to produce identical twins. We can take two embryos and put them together.

Figure 2. Bovine embryos from a nonsurgical flush 8 days after breeding a superovulated cow.

The heifer in the next photo (Figure 3) is my pride and joy. Let me tell you a little bit about her. Two of her parents are Charolais, double-muscled and polled. Two of her parents are Jersey. We took those two embryos and put them together to see if we couldn't take the extra hyperplasia, that extra growth associated with double muscling and slow it down a little while the calf was in the uterus of the cow so we didn't have to take a 150 lb calf out the side door. At the same time we were trying to take advantage of the hyperplasia and the low myoglobin content so that we could perhaps get an 800 lb animal that could sell at white veal prices.

Figure 3. Chimera heifer with two polled Charolais parents and two Jersey parents.

Unfortunately it was a little like the story of when Marilyn Munroe and Albert Einstein met. Marilyn said to Albert, "Wow, with my looks and your brains we could have kids that could be real knock-outs". Albert knew a little more about nature and knew it was strictly chance as to what genetic recombination would do and he said, "Yes, I agree, but we would run the risk of having children with my looks and your brains". That is what we got in this heifer. As one of my neighbours described her, who would want to produce a polled Longhorn. What happened in scientific terms was that the Jersey cells completely shut down all the double-muscling.

A more dramatic illustration of this was when we combined a sheep embryo with a goat embryo. The animal, where it has wool, has cells that were derived from the sheep parents. Where the hair is, are cells derived from the goat parents. Her face shows that half was developed from the goat parents and the other side from the sheep parents. This kind of research was to see if we could develop a way of expanding some of our endangered species and also to determine ways to develop different growth patterns that might combine some of the attributes of more than one species.

In our normal embryo transfer procedure, we have a superior donor cow and want to get a whole bunch of offspring all the same age as opposed to getting offspring over the 10 year lifetime of that cow. During that normal procedure (Figure 4) we can put the embryos together or split them and have identical twins. A number of people are producing identical twins like this so that they can have two identical bulls with the same genetic potential. They may not look exactly alike but they have the same genetic potential. If they have 60 cows that they want to breed to one bull, they split that bull power into two and get more calves from that bull a lot faster.

Another aspect of genetic engineering involves introducing genes which contribute to economic characteristics in animals. The idea here is to perhaps introduce disease resistance and increase growth effects. Now we are talking high-tech options. We did some genetic engineering with mice. In one particular transgenic mouse line, that is the name we use for

genetically engineered animals, we have enhanced a small gene product that causes the multiplication of the cells that produce fat. This particular mouse is grossly overweight to say the least, but from an efficiency point of view, this mouse is unbelievably efficient, particularly when you consider the fact that there is 2.25 times as much energy in fat as there is in carbohydrates. But 'Fatty' has some reproductive problems. Another transgenic line has a human growth hormone gene incorporated into its genome and the animal is constructed in such a way that whenever we give this animal drinking water with a little zinc in it, the growth hormone in the liver is switched on and augments the growth hormone produced by the pituitary gland of the mouse. It grows from 1.75 to 2 times the size of its littermates that have not been genetically engineered. Because it is in the mouse's genome, it will be inherited from generation to generation. There are many things we don't know about these particular kinds of animals and I'm not saying we have answered all the molecular biology and physiology questions because these animals are fit. They are not fit at the present time.

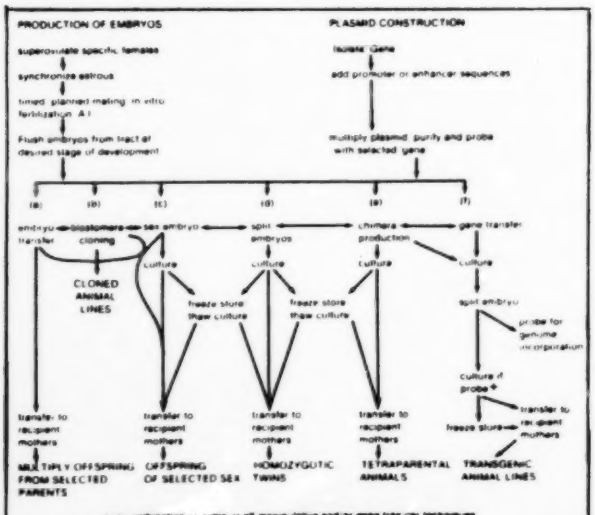

Figure 4. A schematic program for embryo manipulation and gene transfer.

That type of phenomenon is a reality. The same procedure has been used on pigs, sheep and now cattle. In the high-tech side, I see some niches that will be available that are 180 degrees away from the natural beef product we talked of previously. We will produce some novel animals and genetic engineering and recombinant DNA will have a lot to do with that. It will involve new kinds of biologics, new kinds of vaccines, new kinds of antibiotics, and new kinds of implants, like genetically engineered bovine growth hormone which is causing a lot of controversy at the present time. It causes dairy cows to keep producing growth hormone. It doesn't tail off, but keeps producing for the entire lactation. Of course, with the American dairy buy-out program in the US, it is interesting that there is a big demand.

Some people have said this type of high-tech management will be profitable for the big corporations and big corporate farms. I don't think so. I think the small guy, the individual farmer will utilize this niche. Take the example of the small dairy operator. Instead of meeting his cash flow by going from 50 to 70 cows as he would at the present time, he will stay with his 50 cows, use growth hormone, and get the same milk production as he would have out of 60 or 70 cows. As far as I know, there is only the individual farmer that has the knowledge, the management and the initiative and drive to make these kinds of things work.

Let me give you another example (Figure 5). We will also inject recombinant DNA organisms that help in disease control. We'll add things like production. We will probably sometime in the future have animals that have disease resistance built, genetically engineered, right into them. We may change their composition or change their growth patterns. Possibly we will genetically engineer a cow to produce a milk that has a casein or milk protein content that produces better or

different kinds of cheese. There are other programs designed to make the cow produce antibodies continually so that all of her milk is like colostrum, through which her calf will have this disease resistance all the while it nurses.

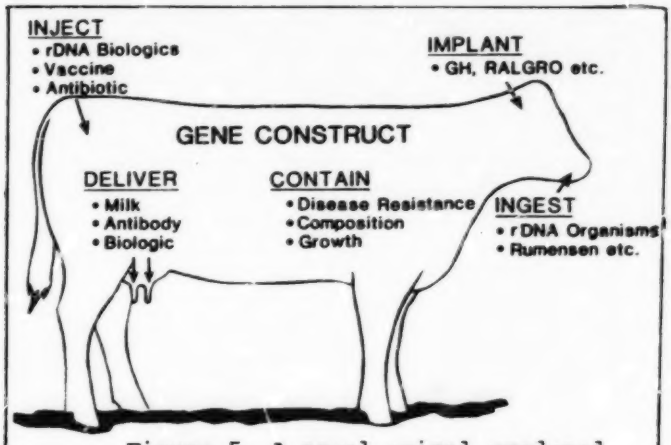

Figure 5. A novel animal produced through genetic engineering.

In addition to that, I see the opportunity for what I call animal production packages. These will be animals which give milk and may even have something like a human insulin gene incorporated into their genome. The human insulin would be secreted into the milk, and separated out to provide an alternative to genetically engineered insulin that is currently available and which 99% of all insulin-dependent diabetics are taking at the present time. So there are some real opportunities for biologics in that area. It may sound ridiculous, but one cow can produce the same amount of a peptide in her milk, using her fermentation vat or rumen, as a 1000 liter fermenter can with all the engineering and the paraphernalia that goes with it. So it is not really far-fetched and will be an opportunity in the future for some of us to have an alternative and option for cash flow.

It will mean that a calf born in the snow someplace will have an opportunity for longterm production of biologics that aid in its health and survival. It will also mean that we have products available for the feedlots that further ensure the survival of that calf. One of the first transgenic or genetically engineered bovine calves in the world has a gene which infers some disease resistance. That calf and its dams were challenged not too long ago. The cow was in trouble but the calf was okay.

While we may increase and change the composition of cow's milk, I suspect that in the future the dairy cow will be derived from a Jersey and will have a milk composition more like human milk than cow's milk because fifty percent of the human population cannot fully handle cow's milk.

In the not too distant future, instead of blood-typing and other tools purebred breeders are using, things like recombinant DNA technology, DNA probe analysis and repetitive fragment analysis will make pedigree analysis obsolete. Biotechnology will enable us to tell who the parents of a particular animal are.

We will have electronic identification. Much is being introduced with horses at the present time where about the only thing you'll do in terms of identifying the animal is put a small unit behind the ear and when it goes past a particular sensor, it will identify that animal and its history. The critical trials with this type of instrumentation are currently ongoing and are primarily designed for dairy cows as an aid in detecting heat so that AI can be more successful. In the near future, those types of things will be implanted into cattle so that as soon as the temperature starts to rise, which is usually a day or two before the ears start to droop, you have a pre-warning of disease conditions. These are some of high-tech options.

IN CLOSING

Except for this winter, you could say that this is what genetic engineers dream here in Saskatoon:

> Imagine, the savings in feed if life stops for the winter.

I want to go back and reinforce what I said earlier. This is what Will Rogers said about the cattle business:

> All you have to do is buy stock, wait for the price to go up, then sell them. And if the price doesn't go up, don't buy them.

Let me end with one aspect. That is, whether you exploit the operation you have at the present time, the high-tech end or the low-tech end, you will have to combine your management, your financial resources, your geography and your climate and it will be driven by how well you respond to the consumer.

We are in an era where government is by pressure group and there are two things that are paramount here. We that are involved in food production make up about 4% of the population. That is a small number of votes. We don't have an effective opposition to consumer perception; we don't have an effective opposition to the 'animal rights' group. You think they aren't strong? As of January 1st in Great Britain, you can no longer dock a collie dog's tail or a pig's tail.

The declared objective of the animal right's group in the US and Canada is to eliminate what they call factory farming. They have the money and the dedication and can manipulate the media for that other 96% of the population. Secodnly, we have consumer groups. Most of you were in the cattle business in 1973. One housewife in Denver effectively took on the whole continent's beef industry and brought it to its knees. She said it was totally wrong that consumers should be ripped off by high beef prices. That is consumer pressure.

The example of the Oregon group and their Country Natural Beef illustrates a direct link between producers and consumers. That link is needed and it doesn't matter whether you grow pumpkins outside of North Battleford, wheat in Estevan or run a cow-calf operation in Pierceland or a feedlot in Kindersley. If we forget about that consumer, then everything else we do is fruitless. We must remember that our market is exactly as the consumer sees it.

Our common approach is to cry for government help. That ain't the way you gotta do it, ladies and gentlemen. From my point of view, our salvation is in educating, in talking to, and in providing the consumer with the quality cheap food that we can in North America. No other place in the world has the cheap selection of quality food that we have in Canada and the United States. Unfortunately, through a whole bunch of accepted mismanagement, many of us were responsible for it. We are on the end of a tiger's tail, in danger of falling off. I suspect we will fall off. The catch is to land on your feet, running, hopefully with one hand on the consumer.